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THE GULF PUBLISHING COMPANY

The OIL WEEKLY and The COMPOSITE CATALOG for the drilling-producing-pipeline industry

PETROLEUM REFINER and The REFINERY CATALOG for the refining-natural gasoline industry

LOOKING AHEAD
... with the Editor

CORROSION of oil-well subsurface equipment is as old as the industry. Seldom, however, have corrosion problems approached the economic importance of corrosion of high-pressure wells, and especially in some condensate fields. As a portion of the effort to obtain a solution to this problem, waters from condensate wells have been examined to determine their chemical properties. Several important factors were noted in this study, and will be reported upon in a forthcoming article.

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THE OIL MAN'S CALENDAR

MAY 11-13	A.G.A., Natural Gas Department, French Lick, Ind.
17-18	Oklahoma Industrial Safety Conference, Tulsa.
25-26	Spring Meeting, Mid-Continent District, API, Division of Production, Mayo Hotel, Tulsa.
JUNE 13-14	Spring Meeting, Southwestern District, API, Division of Production, Rice Hotel, Houston.
OCT. 3- 4	American Association of Oil Well Drilling Contractors, Blackstone Hotel, Fort Worth.
12-13	Texas Mid-Continent Oil & Gas Association, Houston.
NOV. 13-16	American Petroleum Institute, Stevens Hotel, Chicago.

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The Changing Panorama

Deferments for Production Men

DURING the first two weeks after Selective Service announcement that all 26-year olds would be inducted into the military service, the production division of PAW received 600 applications for deferments, of which 200 have been approved. Deferments have included petroleum engineers, a few civil engineers, geophysical-crew members (largely party chiefs), and other classes.

It is estimated these are approximately half of the requests for deferment of 26-year olds that will be made by the production branch of the industry.

Requisites for deferment are: a college education, at least two years in business, engaged in activity essential to the war industry, and one in which deliveries are behind schedule. Under this program, the refining branch of the industry, because of the manufacture of aviation gasoline and synthetic rubber, will receive the largest number of deferments. How many requests have been received and approved for refining work is not known. In fact, it was only after considerable argument that crude-oil production was given the right to request deferment, and this was on the basis of its contribution to the shortage of aviation gasoline and synthetic rubber.

Need for Avoiding Wasteful Production

ALTHOUGH it is conceded that the oil industry currently is enjoying better relations with Congress than in many years, the threat of an oil-control bill still hangs over the industry. A measure, probably similar to the unsuccessful Cole control bill of a few years ago, would be introduced quickly if a wasteful drilling campaign or production orgy should develop.

Therefore, it is important that the industry and new oil-producing states, like Mississippi, Alabama and Florida, do everything they can to prevent the start of a wasteful situation. It is true that PAW's 40-acre spacing regulation probably will take care of the drilling situation, but that still leaves the matter of production rates to consider. Several of the recently discovered big fields in Mississippi, for example, might easily embarrass the industry.

"One thousand four-engine bombers flying to an objective 1000 miles away and fueled by 100-octane, can carry 5 million more pounds of bombs than would be carried if 91-octane were used."

From GASOLINE CONSERVATION, *a booklet issued by* OWI, PAW, OPA, *and* ODT.

Rewarding Careful Production Planning

PLANS for building a gathering system that would keep outlet facilities abreast of the development program (soon to embrace 50-odd drilling wells) in the rapidly growing Heidelberg, Mississippi, field have been rejected by PAW's transportation division. Consequently, oil from this field may be delayed in reaching the market, for we all know it takes time to get plans approved today, that it also takes time to manufacture pipe, and time to lay lines.

This might cause temporary loss of considerable production, for Heidelberg is generally rated the most important discovery in recent years. It appears likely to cover at least 6000 acres, probably 7500 acres, and perhaps 10,000 acres. Estimates on recoverable oil from its 200-foot producing section range upward from 100 million barrels to 150 million barrels, and a few place the figure as high as 250 million barrels.

The plan for construction of a Heidelberg gathering system, which was submitted to PAW, requested the allocation of steel, and the manufacture of pipe, on a calendar-quarter basis, and thus would extend well into 1945—not ahead of field development. If a dry hole should be drilled in a part of the field previously expected to produce, pipe requirements for the following quarter could be reduced or cancelled, assuring no waste of materials.

It is understood PAW could not see the necessity or advantage of preplanning such an extensive gathering system in a two-well producing field, although it must have known of the sizeable drilling program contemplated.

Such careful planning would have made Heidelberg oil readily available, at the same time taking into consideration the steel situation. It is the type of planning, we thought various PAW officials meant when they told the industry it must preplan needs for materials. New fields can add nothing to existing oil supples unless an adequate outlet is provided and in such promising areas as Heidelberg, careful preplanning deserves fullest official consideration so that no delays will result.

A One-Man Federal Judiciary

THE idea of any one man appointing the federal judiciary of the United States is repugnant to Americans, for fear he might entertain peculiar ideas he might wish to put over. Yet that is what has almost happened under the Roosevelt regime, and is likely to become almost 100 percent if he is re-elected for a fourth time. This is one of the dangers of too long a tenure of the nation's highest office.

Roosevelt, as is well known, has appointed 7 of the 9 Supreme Court justices. In addition, he has put 43 appointees on the circuit court bench out of a total of 58 such justices in the nation. Among the 190 federal district court judges, 112 have been appointed by Roosevelt.

Venezuela Oil Not Keeping Pace

PAW's program for increasing Venezuela's producing capacity to approximately one million barrels daily and for drilling approximately 500 wells by the end of 1944 (THE OIL WEEKLY, September 6, 1943) is not keeping up to schedule, which called for an increase in production of nearly 40,000 barrels monthly. Materials and shipping space, plus a shortage of lake tankers, are the critical factors delaying drilling and production development of the country. PAW's foreign divisions and committees are trying to find a solution to the problem.

Last December, Venezuela output was just under 600,000 barrels per day, or practicaly back to its 1941 daily average production of 610,000 barrels daily.

Getting Gasoline Facts to the Public

TO help inform the public of the critical gasoline situation that now prevails on account of the war, the Product Conservation Committee of the Petroleum Industry War Council has taken the lead in disseminating the facts in a manner to arouse widespread attention. A portfolio of advertising ideas and suggestions has been mailed to all oil-company presidents and to their marketing and advertising officials. In-

cluded is a pamphlet on gasoline conservation which was prepared jointly by OWI, PAW, OPA and ODT, containing much information which has heretofore been held secret.

Designed to assist oil companies in preparing suitable advertisements to acquaint the public more thoroughly with the gasoline shortage, the suggestions deal primarily with the large increase in consumption of gasoline by the military forces. Several relate to the black market in gasoline coupons and others would encourage formation and maintenance of car-sharing clubs. Some of the ads were designed for group or associations and deal with subjects that can be handled jointly.

Several oil companies have utilized the ideas in their advertising and it is hoped that the response will be general. While the campaign is purely voluntary, it is believed that much good can be accomplished if the industry lends its full cooperation looking toward conservation of gasoline and elimination of the black market in coupons, which has developed into a serious problem.

Protective Coating Boon to Oil Industry

NEEDS of the Army Ordnance Department have led to development of a protective coating that promises to eliminate the tendency of metal surfaces to rust under the excessive moisture encountered while being shipped to tropical areas. The coating, termed a "compound protective ethylcellulose stripping," therefore promises a solution to one of the serious difficulties of shipping machined parts to such regions.

The oil industry, and many other industries, may find its application highly beneficial. One of the serious secondary drawbacks to exploration in tropical areas is the tendency of metal surfaces to rust, while parts fabricated from cloth, leather and other organic materials tend to mildew and swell, destroying their usefulness or requiring extensive treatment to put them back in condition. These troubles are especially serious on the highly sensitive instruments used in geophysical work.

Parts dipped in the coating, which resembles a molten plastic material, pick up a thin continuous film, drying in a few minutes to shut off the metal from moisture, fumes or other injurious conditions. When the part is required, the film can be slit and peeled from the protected unit without damage to it, leaving it in the condition existing at the time the protective cover was applied.

Publishers Have Problems, Too

WHILE manufacturers of oil field equipment are having trouble making delivery on equipment their customers would like to have; while oil companies and drilling contractors because of obvious handicaps are using every form of ingenuity at their command to carry on their business; while manpower shortage hampers almost all oil operations; while refiners are having to cut down the amount of gasoline to their former customers—publishers of oil papers, too, are having their problems, and for identically the same reason—the war!

Steel, manpower and oil have all gone to war, and right along with these, paper has gone, too. From a practical standpoint it does not matter whether the steel, manpower, oil and paper are being wasted in the war effort in spots; the fact remains that oil publications have been drastically cut in the tonnage of paper available to them, and they, too, are exercising every possible ingenuity to meet the emergency.

In the case of THE OIL WEEKLY, a study has been made as to the number of words that could be placed on each page, and a short time ago spacing between lines normally desirable was reduced in order that 20 percent more information could be put on a given page. The weight of the paper used in publishing has been drastically cut. In the case of THE OIL WEEKLY paper stock has been reduced from 55 pounds per ream down to 35 pounds per ream. Incidentally, as the paper base weight is cut, the price per pound goes up, with a result that a ream of 35-pound stock actually costs as much as a ream of 55-pound stock prior to the war. In addition, the lighter weight paper has slowed down press production at a time when the manpower problem in the publishing business is as serious as in manufacturing or drilling. Further economies have been effected through trimming the borders—that is, reducing the overall size without reducing the type size.

Along with the reduction in paper weight has come inadvertently a reduction in the quality of paper stock used. The new paper stock makes it more difficult to get satisfactory reproductions, and more time is employed on the press to achieve results which would have been nothing to boast about in prewar days.

All business publications have this common problem.

In our individual efforts to meet the situation, we have been faced with other problems peculiar to the oil industry. Thus far, our efforts have evidently been fully appreciated by both subscriber and advertiser alike. Both apparently realize the difficulties faced by the publishing business.

For the forbearance of our subscribers and our advertisers, we are deeply grateful. In turn, we pledge the use of the greatest possible discrimination in the selection of material to appear in THE OIL WEEKLY.

Oil Big Factor in Foreign Policy Talk

MANY political commentators expect foreign policy to become a major issue in the forthcoming presidential campaign. They say that Republicans are likely to make foreign policy a major campaign issue because many of them disagree with the course of the present administration and also because it is seen as a good vote-getter.

If foreign policy does become an important campaign issue, oil no doubt will be a major factor in the debates. An adequate oil supply has become a most important national question, and also is the most important question in the Roosevelt administration's foreign policy to date.

Divide and Conquer

NO very intelligent man can claim that the present administration in Washington has kindly feeling for the oil industry. Most oil men are of the type which resents regimentation, of the type exemplifying individual effort. So when a gesture is made which would divide the oil industry into two camps, it is well to study it carefully. The subsidy dangled out as a bait to owners of stripper wells smacks very much of being a wedge to be driven between operators owning stripper wells and other operators whose properties contain no (or a minimum of) stripper-well production.

If the New Dealers can divide the oil companies they have made a forward step in the conquering of the entire industry. Hitler followed a somewhat similar course in his efforts to keep quiet his prospective victims until the time was ripe. Had all of present conquered Europe presented a united front to the Nazis, Hitler's number would have come up long ago and countless victims of this war would be living and happy today. The idea, "divide and conquer," is as old as history—and history shows that usually the man with the idea has been able to fool a sizeable number of victims.

WASHINGTON ROUNDUP

By BERTRAM F. LINZ, Washington Correspondent

INITIAL conferences between British and American oil experts concluded last week with general agreement on the principles to be adopted for postwar exploitation of world petroleum resources in an orderly and equitable manner. Before the end of the month, the full report now being written by the American experts is expected to be in the hands of the President's committee which, some time this summer, will meet with a corresponding British delegation for the final working out of a basic program.

Congressional Investigation—In other sectors of the Washington front, House and Senate committees investigating oil problems planned for public hearings on all phases of the situation, one of which is scheduled to begin May 15.

PIWC and Stripper Subsidy—The PIWC, in its monthly meeting, attacked the OPA-Vinson proposal for a stripper-well subsidy but refrained from taking definite action so as not to raise any barriers to aids to segments of the industry which are in urgent need of relief.

PIWC, Draft, Supplies—Meeting the PAW program of 24,000 wells during the year depends to a large extent on consideration given by selective service to drillers, derrickmen, etc., PIWC was told. Restrictions on supplies for the oil industry cannot be lifted at this time, it was explained.

New Tankers—Sixty-eight new tankers have been approved by the War Shipping Administration, these to be built from 1945 appropriation funds but it was declared there are no additional tankers available for civilian use now or projected for in the future.

Davies to Texas—Plans for Deputy Administrator Davies' trip to Texas to discuss PAO-11 with District 3 operators were still up in the air, with indications that it might not be possible until toward the end of the month. Davies is expected to appear before the Lea committee next week. When he does go to the Southwest, however, he probably will stop over in St. Louis for a discussion of spacing.

Oil Forces Spain— Another indication of the power of oil was given last week, when Spain conceded most of the demands of the Washington and London governments to curtail exports to Germany. These concessions were made in the admitted hope of obtaining a resumption of oil shipments from the Western Hemisphere, cut off in January because of Spain's refusal to sever her ties with the axis.

Sixty-eight New Tankers From 1945 Appropriation

War Shipping Administration has approved construction of 68 tankers out of its 1945 appropriation, with indications that these and other vessels to be built will go into Pacific service.

At the same time, PAW Deputy Administrator Davies disclosed that "not one ocean tanker is available to us for moving civilian gasoline into the East," and warned that "further, in spite of the new tanker construction program, there are no additional tankers available for civilian use now or projected for in the future."

Davies said the gasoline situation this summer will remain tight, with an exceedingly thin margin between supply and demand, and there is no possibility of increasing rations.

The Maritime Commission disclosed that certain existing contracts have been revised so that the oil ships may be delivered by July 1, 1945.

The special facilities of the Sun Shipbuilding and Dry Dock Company at Chester, Pa., will be used for the construction of 24 of the new tankers, part of a total of 50 scheduled for that company during 1945.

Contracts for the construction of 38 of the tankers has been awarded to the Kaiser Company, Inc., Portland, Ore., and the remaining six will be built by the Bethlehem-Sparrows Point Shipyard, Inc., Sparrows Point, Md.

The monthly construction report of the Maritime Commission showed delivery in April of 17 standard large tankers under the long-range construction program, and one coastal tanker.

President's Committee Will Consider Report from British-American Talk

The preliminary "exploratory discussions" in which American and British officials and oil experts have been engaged in since April 16 were concluded May 3 in a joint session which approved the reports of the results of the conferences for submission to high officials of the two governments.

"In a spirit of understanding and cooperation," the State Department announcement said, "the two groups explored the full range of both countries' interest in petroleum on the basis of broad principles looking to the orderly long-range development of abundant oil supplies. The two groups are now reporting the results of these discussions to their governments.

In Washington, the report of the American experts will be considered by the cabinet committee appointed by President Roosevelt. Chairman is Secretary of State Cordell Hull, other members being Secretary of the Interior Harold L. Ickes, vice chairman; Acting Secretary of the Navy James V. Forrestal, Under Secretary of War Robert P. Patterson; Charles E. Wilson, vice chairman of the War Production Board; Charles Rayner, petroleum adviser to the State Department; Leo Crowley, director of the Foreign Economic Administration, and PAW Deputy Director Ralph K. Davies, the last two having been added since the committee was set up March 7.

In its statement on the conference, the State Department made no mention of specific matters such as elimination of cartels, curbs on imperialistic exploitation, but did disclose that PRC Saudi Arabia pipe line and other projects came up for consideration. Confining itself to the most general outline of the agenda of the meetings, the department said:

"After full discussion of broad principles, the two groups reviewed various specific matters of mutual interest relating to the production, distribution and transportation of oil.

"These specific matters included pending problems affecting the oil operations abroad of the American and British oil industry, questions relating to oil production particularly in the Middle East, the proposed trans-Arabian pipe line and Iraq Petroleum Company's project for an additional pipe line from Kirkuk, Iraq, to Haifa.

"The groups shared the view that the peacetime inter-governmental aspects of such matters should be resolved, as between the two governments, within the framework of the broad principles which had been discussed."

The expert group which represented the United States now is engaged in the preparation of a lengthy detailed report of the conference, to buttress the memorandum drawn up by the delegations of both governments, for consideration of the President's Committee. It is expected that the report and memorandum, which covered all of the matters on which there was discussion

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American and British conferees who concluded their sessions last week at the State Department. Left to right, Sir William Brown, Charles B. Rayner, Sir William Fraser, J. H. Le Rougetel, Ralph K. Davies, F. C. Starling, Col. H. Blake-Tyler, Harold Wilkinson, William Hoyter, Sir Frederick Godber, F. Harmer, Commodore A. W. Clarke, Victor Butler, Paul Alling, Leroy Stinebower, Commodore A. F. Carter, Brig. Gen. H. L. Peckham, C. S. Snodgrass, John Loftus, George Walden, James C. Sappington III.

and agreement will go to the committee before the end of the month.

After study by the President's Committee, another joint meeting with a similar British delegation will be held, at which the final agreement, treaty or whatever form the arrangements may make will be perfected.

It is expected that the President's Committee will be assisted in its deliberations by a committee of advisors, on which the industry will be represented. The formation of such a committee was suggested by the American expert group. The members would have a more official standing than did the oil men who participated in the preliminary conferences, being appointed by the government, and would have the task of studying problems that should be considered in arriving at final conclusions.

The discussion of the Saudi Arabia pipe line, it was disclosed, did not go into the merits of its construction, but was confined to the influence it would exert on transportation and distribution if in existence at the end of the war.

Record Production Needed To Meet May Requirements

A domestic production of 4,400,000 barrels of crude oil daily will be required this month to meet market demand, it was estimated last week by the Bureau of Mines. Certifications of PAW for the month called for an average of 4,519,700 barrels daily. The May requirements, the Bureau figures, will be 538,000 barrels, or 13.6 percent higher than demand in May 1943.

Statistics indicate that demand for domestic crude in the first quarter was 4,441,000 barrels daily, an increase of about 2 percent over the preceding quarter and almost 18 percent over the first quarter in 1943, while total crude runs to stills averaged 4,364,000 barrels, an increase of almost 4 percent over the preceding quarter and 21 percent over the first quarter last year.

This record demand, the bureau pointed out, was met by a gain of about 14 percent in production, a substantial decline in crude oil stocks and a material increase in imports of foreign crude as compared with last year. Such data as is available for April indicates that demand was higher than forecast.

New Agreement Lowers Price of Canol Oil to United States

Oil from the War Department's Canol project will cost the United States only 20 cents, Canadian currency, per barrel plus production costs, instead of $1.25 per barrel, plus costs, originally agreed upon, and the Army will be permitted to purchase, at the same price up to 60,000,000 barrels of oil after the war, under a revised agreement reached with Imperial Oil, Ltd., it was announced by the War Department May 5.

"In addition to the use of the petroleum products during the present war, the new agreement is fundamentally a matter of insurance that in the future the defense of the continent will not be endangered as it was early in 1942 by lack of locally produced oil in the northwest," Under-secretary of War Robert P. Patterson said, in announcing the new deal.

Patterson pointed out that the new arrangement is in line with the recommendation made last January by the Truman Committee in its report on the project that equitable agreements be made giving the United States postwar rights to Canol oil.

The more favorable price of 20 cents per barrel for all oil, as compared with the original price of $1.25 per barrel for the first 1,500,000 barrels, he said, was made possible by the fact that reserves are greater than first thought, making it possible to meet early exploration and development costs by larger sales at the lower price.

Under an arrangement for the disposition of equipment owned by the United States, the net cost of the oil may be reduced to as little as 15 cents per barrel, it was claimed by the department in an explanation of the new agreement.

Postwar Rights

The War Department has suspended its exploration for additional oil reserves in the Canadian Northwest, but under the new arrangement further exploration will be continued by Imperial Oil. In addition Imperial will proceed with the development of the proved Norman Wells field so as to have an assured supply of oil up to 4000 barrels per day for the Army's refinery at Whitehorse, Yukon Territory, which began operations on April 30. After the war is concluded, the agreement provides that the United States shall have the continuing right to obtain for its use one half of the remaining oil reserve in the proved Norman Wells field up to 30,000,000 barrels and the right to purchase 10 percent of the oil in any fields discovered by company in the region, until a total of 60,000,000 barrels from the two sources is acquired.

Rental Rate Set

During the actual prosecution of the war, drilling and other oil field equipment owned by the United States will be rented to Imperial Oil at a rental rate of 5 cents per barrel reduction in the agreed price of 20 cents per barrel. At the end of the war, title to the equipment will be transferred to Imperial and the equipment paid for at the 5 cents per barrel rate, thus making the purchase of the equipment $3,000,000 of 60,000,000 barrels are purchased as provided by the agreement.

This, the department pointed out, reduces the net cost of oil, as supplied by Imperial Oil to the United States to 15 cents a barrel plus production costs, inasmuch as the cost of removing the oil field equipment at the end of the war might well exceed its actual value. Under the agreement, the right of the United States to secure up to 60,000,000 barrels of oil continues indefinitely except that if, after May 1, 1954, Imperial Oil has a commercial outlet for other than local needs, the United States shall take its oil each month at the rate of 20 percent of the total delivered or sell the same to Imperial at the price it is receiving commercially.

PIWC Strongly Criticizes Handling of Oil Price Problem

Stripper-well subsidy proposal is termed inadequate by council which still holds that general price increase is only effective remedy; draft deferment of essential production men again urged

STRIPPER-WELL subsidies were the major subject of discussion at the May meeting of the Petroleum Industry War Council, a long and heated discussion being followed by adoption of a resolution which, in effect, told the government that while the Council is anxious not to stand in the way of any segments of the industry which need financial assistance it is still unalterably of the belief that a general price increase is the only proper and effective way of solving the oil-supply problem.

The Council was able to conclude its meeting in one day, after receiving a brief and general report on the then-concluding Anglo-American oil conference from State Department Petroleum Adviser Charles Rayner, a still shorter talk from Administrator Ickes and a visit from five members of the British oil delegation.

PAO-11 came up for brief consideration but action was held up to give Deputy Administrator Ralph K. Davies an opportunity to make his promised trip to Texas for discussions with operators. Davies is expected to go to the Southwest the middle of the month, after appearing before the Lea committee, currently holding hearings on the oil situation.

The Council adopted a resolution approving the submission to Stabilization Director Vinson of a request that he overrule the Bureau of Internal Revenue, which has refused to accede to PAW urging that it return to its previous practice of allowing oil operators the election of capitalizing or expensing certain geological and geophysical costs incident to exploration.

Selective Service Consideration

It also adopted a resolution supporting PAW's effort to have Selective Service classify rotary derrickmen as engaged in a "critical occupation," pointing out that the number of rotary rigs in operation now is at an all-time high of more than 1400, absorbing all the trained and partly-trained men available, and the drafting of these men is causing shut-downs. Continuance of the present selective service induction program, it was declared, might result in the shutting-down completely of two thirds of the rigs now operating, because no suitable replacements are available.

Consideration of the stripper-well subsidy proposal brought sharp criticism from the Council of the manner in which the price problem has been handled.

Analysis of the effect of the subsidy showed that it would cost the government $54,544,870 a year, a sizable segment of which would go to the Pennsylvania-grade operators, who are to be given 75 cents per barrel, the additional income to operators in the several states and districts being shown in accompanying tables.

Five hundred fields and 258,476 wells will be affected by the subsidy plan, tabulations by states and PAW districts show. Data used in the summary, it was explained, was taken from THE OIL WEEKLY Yearbook-Forecast Number, January 31, 1944 and were based upon daily average production at the end of 1943 divided by the producing oil wells at the end of 1943 by fields.

Daily average production affected is 412,872 barrels, annual production affected 150,698,280 barrels; total daily average payments would be $149,438, with annual payments running $54,544,890, making average payment on production affected 36 cents per barrel and average payments on nation wide production 3½ cents per barrel. Annual payments Penn Grade area would be $18,149,625, or 33 percent of total payments.

Percent of production affected based on daily average production at end of 1943 is as follows: District 1—100 percent; District 2—17.2 percent; District 3—5.5 percent; District 4—20.4 percent; District 5—4.1 percent; nationwide—9.5 percent.

In a statement submitted by the production committee, it was pointed out that the Council has filed specific recommendations with the administrator for meeting the price problem, in which it "has drawn on the information and experience of the vast petroleum industry and has attempted to use this information and experience to guide and direct the industry and the government along a course that would insure the economic life of the domestic producer and in turn a continued supply of essential petroleum products for present and future use."

Necessity for "proper play of economic experience" to permit the industry to maintain its war-increased activities under the burden of added costs and difficulties has repeatedly been presented, it was asserted, but "although these necessities are becoming ever greater there has been little relaxation

Estimated Effect of OPA Stripper Well Subsidy Proposal

State and PAW District	No. of Wells Affected	DAILY AVERAGE PRODUCTION (Barrels)* A ($0.35)	B ($0.25)	C ($0.20)	Penn Grade ($0.75)	Percent of Total Affected Product	Total Production Daily Average	Percent of Total Payments	Total Daily Payment
Arkansas	2,041	549	.....	12,942	.....	.....	13,491	.....	$ 2,781
California	4,090	.....	1,096	31,598	.....	.....	32,694	.....	6,594
Colorado	60	110	.....	81	.....	.....	191	.....	55
Illinois	15,078	11,069	1,906	7,232	.....	.....	20,207	.....	5,797
Indiana	1,126	1,668	83	15	.....	.....	1,766	.....	508
Kansas	2,189	7,716	1,829	546	.....	.....	10,091	.....	3,267
Kentucky	146	317	136	125	.....	.....	578	.....	170
Louisiana	2,259	7,819	6,161	2,846	.....	.....	16,826	.....	4,846
Michigan	2,200	5,549	3,394	818	.....	.....	9,761	.....	2,955
Missouri	128	217	.....	.....	.....	.....	217	.....	76
Montana	1,367	5,756	65	8	.....	.....	5,829	.....	2,033
Nebraska	22	11	.....	.....	.....	.....	11	.....	4
New York	22,190	.....	.....	.....	13,000	.....	13,000	.....	9,750
New Mexico	487	650	330	1,700	.....	.....	2,680	.....	651
Ohio	23,350	4,200	.....	.....	4,600	.....	8,800	.....	4,920
Oklahoma	43,553	67,575	26,762	11,876	.....	.....	106,213	.....	32,717
Pennsylvania	85,000	.....	.....	.....	40,200	.....	40,200	.....	30,150
Tennessee	28	33	.....	.....	.....	.....	33	.....	12
Texas	32,981	67,489	20,385	16,202	.....	.....	104,076	.....	31,957
Utah	5	15	.....	.....	.....	.....	15	.....	5
West Virginia	17,400	.....	.....	.....	8,500	.....	8,500	.....	6,375
Wyoming	2,776	1,091	255	16,347	.....	.....	17,693	.....	3,715
Total	258,476	181,834	62,402	102,336	66,300	.....	412,872	.....	$149,438
District 1	124,590	.....	.....	.....	61,700	14.9	61,700	31.0	46,275
District 2	87,820	98,355	34,110	20,612	4,600	38.2	157,677	33.8	50,526
District 3	37,768	76,507	26,876	33,690	.....	33.2	137,073	27.0	40,235
District 4	4,208	6,972	320	16,436	.....	5.8	23,728	3.8	5,808
District 5	4,090	.....	1,096	31,598	.....	7.9	32,694	4.4	6,594
	.....	.....	.....	.....	.....	100.0	412,872	100.0	$149,438

*Class A—Less than 5 barrels daily—$0.35 per barrel.
Class B—5 and 6 barrels; less than 7 barrels—$0.25 per barrel.
Class C—7 and 8 barrels; less than 9 barrels—$0.20 per barrel.
Penn. Grade—$0.75 per barrel on all production.

of the imposed rigid financial restrictions on the industry.

"Our recommendations on price incentivies have been ignored by those governmental agencies controlling price.

"There exists today a serious situation with regard to exploration and production of raw material—crude petroleum. The need for relief along this line is great.

Plan Called "Inadequate"

"Many units in the industry are now seriously hampered through want of proper price for their product and danger exists as to serious loss of producing capacity to meet current and future needs."

The committee reported that the summary from Director Vinson, outlining the manner in which it is proposed to afford relief to stripper well operators, offers a plan which "is entirely inadequate to meet industry requirements previously recommended by the PIWC and PAW" and will not meet the overall need of the industry for proper compensation for oil produced.

"Our experience affords no guide to enable us to support an approval of the suggested program," it said. "The summary does not give sufficient details of the plan to enable us to make a sound analysis."

It was pointed out that the industry has repeatedly recorded its opposition to subsidies on principal, but at the same time the committee held it would not be fitting for the Council, representing the industry as a whole, to take any action that would foreclose the possibility of additional payments to a group representing any segment of the industry.

"Some of the producers will undoubtedly accept these premium payments if they are made effective by the government," it commented, but, it concluded, "it is the opinion of the PIWC that a general price increase on petroleum and its products is the proper method of compensating for increased finding, development and operating costs."

The working subcommittee of the council's committee on petroleum economics forecast that crude oil production this year will average approximately 4,500,000 barrels daily, nearly 400,000 barrels above the 1943 average and 700,000 barrels above that for 1942.

But Dr. Robert E. Wilson, chairman, emphasized the increased production will not mean any increase in civilian rations of gasoline or heating oil, barring a successful conclusion of the European phase of the war.

Highlighting the committee's report was criticism of the government's failure to develop the Elk Hills naval reserve, frequently advocated by it in the past year as California inventories declined.

"It is a sad commentary on governmental operations that the only known field in this country not making its proper contribution to the war effort is the field which was supposed to be kept available to meet just such a wartime emergency need," it was declared. "There should be no further delay in taking the necessary action to develop this field. Around 50,000 barrels daily of production could be developed here before the end of this year if work is started at once."

For the year ending March 31, next, the committee estimated that the average daily amount of petroleum and products that can be drawn from the United States during that period is 5,023,000 barrels.

This average was developed on estimates for the current quarter of 4,889,000 barrels daily, 4,874,000 barrels for the coming quarter, 5,128,000 barrels for the fourth quarter and 5,202,000 barrels for the first quarter of next year.

Estimates follow:

PRODUCT	1944 2nd Q	1944 3rd Q	1944 4th Q	1945 1st Q
Gasoline	1,985,000	2,039,000	1,944,000	1,898,000
Kerosine	193,000	175,000	243,000	259,000
Gasoil and Distillate Fuel	581,000	525,000	729,000	837,000
Residual Fuel	1,275,000	1,200,000	1,366,000	1,411,000
Lubricants	123,000	125,000	124,000	123,000
Asphalt	123,000	154,000	105,000	76,000
Other Products, Crude and Loss	609,000	636,000	617,000	598,000
Total	4,889,000	4,874,000	5,128,000	5,202,000

"Through rather heavy draft on stocks, substantially all of the estimated United Nations needs are met," the committee said, but, it added, the drafts required to meet these needs plus domestic requirements will be unusually heavy during the last six months of the period.

"While such a draft on stocks could be continued during the period without causing undue operating difficulties," it commented, "it could not be continued long thereafter, and it probably represents an inadequate factor of safety as of March 31, 1945. However, it is anticipated that completion during early 1945 of foreign refinery construction and utilization therein of foreign crudes, will supply a larger portion of United Nations' needs from sources outside of the United States. Also, this stock draft can be decreased if tanker availability for importation of foreign crude increases."

Dealing with transportation in and to this country, the committee expects all available tank cars to be utilized throughout the period, with deliveries by rail to District 1 expected to reach 730,000 barrels daily during the third quarter, followed by some decline due to the necessity of diverting cars to non-petroleum uses at that time of the year and the seasonal decline in operating performance.

Pipe Line Deliveries

It is estimated that the Big-Inch will run 310,000 barrels daily during the summer and 305,000 barrels in winter, with a small portion dropped off in District 2.

The Little-Big-Inch, anticipated as handling 170,000 barrels daily was seen, however, as probably entirely lost for civilian movement during the fourth quarter of this year and for some time thereafter, when it is scheduled to handle military products exclusively. Consideration is being given to changes in operating procedure which may increase its capacity.

The Mississippi River floods were reported to have broken two industry lines and reduced the capacity of the Big-Inch by closing down a pumping station, with danger of more serious interruptions. Consequently, the council was told, East Coast stocks must be built above minimum levels to avoid possible serious results by unexpected interruptions.

The survey also disclosed possibility of a deficiency of ocean-going barges for distribution of products between supply and demand areas in District 1. This must be eliminated if serious operational difficulties are to be avoided.

The committee emphasized that to meet East Coast needs during the period the average number of tankers available must at least equal those recently available, a need which may be especially pronounced next winter if the Little-Big-Inch line is diverted entirely to war products. District 3 also must have the outlet afforded by substantial tanker liftings, and some additional tankers must be provided for local service if refining operations and war production there are not to be impeded.

On the basis of current conditions and prospects, the committee estimated that total new supply, which last year averaged 4,413,000 barrels daily and for the first 1944 quarter 4,800,000 barrels, will reach a high of 4,993,000 barrels in the third quarter, decline to 4,980,000 barrels in the final quarter and to 4,951,000 barrels in 1945 first quarter. The difference between the new supply, shown in the table, and the estimated total requirements represents the necessary draft on stocks.

(Daily Averages in Thousands of Barrels)

	1943 Average Year	1944 1st Q	1944 2nd Q	1944 3rd Q	1944 4th Q	1944 Average Year	1945 1st Q
Crude Oil Prod.	4,117	4,419	4,494	4,556	4,536	4,501	4,508
Nat'al Gasoline Condensate, Benzol	248	273	280	286	293	283	292
Reported Imports	48	108	106	151	151	129	151
Total New Supply	4,413	4,800	4,880	4,993	4,980	4,913	4,951

Two other matters of domestic conditions were brought up by the committee.

While the compensatory transportation adjustment plan is now operative for movements of sour crude into District 2, it was found that many refiners remain reluctant to process high-sulphur crude. It was warned, however, that in order to meet indicated demands on the district for finished products and District 3 needs for sweet crude, it will be necessary that the full scheduled delivery of the new 65,000-barrel Stanolind Pipe Line Company line be fully utilized by District 2 refiners.

Indications are that shut-down time at refineries is increasing, primarily because of manpower shortage, and is reflected in lesser contemplated runs to stills than previously expected. "The validity of all of our figures are dependent on the industry not suffering any further net loss in manpower," the report said. This situation is serious and warrants more attention and assistance from the various governmental agencies involved.

Manpower Again

Foreseeing realization of the PAW program to drill 24,000 wells during the current year, Don R. Knowlton, director of production, disclosed that the WPB has been asked for sufficient controlled materials to drill 6500 wells in the third quarter. However, he said, the realization of the 24,000-well goal will depend in large measure upon manpower developments.

Knowlton reported that although the critical shortage of internal-combustion engines and engine parts has not been entirely alleviated, considerable progress has been made in increasing deliveries

of new engines. Substantial shipments of engine-repair parts have been made recently to oil-field-engine distributors, and it is anticipated that within the next three months stocks of repair parts will be at more satisfactory working levels.

Efforts to straighten out the manpower situation are still being pressed vigorously, Knowlton said, and numerous recommendations have been submitted recently regarding deferment requests on technical personnel under 26 years of age.

"A strict policy laid down by the Selective Service System eliminates from favorable consideration all persons not having technical educations or the equivalent. It has been necessary for us to adhere to the procedure outlined even though we realize that there are many men under 26 years of age who are filling such important positions in the industry as drillers, derrickmen and field superintendents.

"A recent survey indicates a critical situation with respect to derrickmen, and we are renewing our attempts to obtain recognition as to essentiality for this classification."

Several amendments to PAO-11 have been issued and several more are in process of drafting, Knowlton said.

One amendment, on Supplemetnary Order No. 4, will make minor changes in the rules governing development operations in California; a new supplementary order which will supersede the present No. 8 in the North and West Central Texas area would lower depth limitation for 10- and 20-acre spacing to 2500 and 3500 feet, respectively, and provide for independent development of shallower producing formations; and a Supplementary Order No. 12 will provide 10-acre spacing for piercement-type salt-dome fields of Coastal Louisiana and Texas.

Knowlton reported interest in secondary recovery at an all-time high, with a 7 to 1 preference for waterflooding over air-gas repressuring.

The PAW production chief also disclosed that a plan to limit royalty payments on public lands to 12½ percent for prospective new development is to be submitted to the Geological Survey for concurrence prior to consideration by the Secretary of the Interior.

Knowlton's office has been unsuccessful in its attempts to prevail upon the Bureau of Internal Revenue to return to its former practice of allowing petroleum operators the election of whether they will capitalize or expense certain geological and geophysical costs incident to exploration.

"We are now engaged in making an appeal of this matter to the Director of Economic Stabilization," he said. "In his price increase denial letter of October 29, 1943, Judge Vinson directed the Petroleum Administration to formulate a program to provide every financial incentive short of a general price increase to assist and encourage the industry to stimulate exploration for new fields. We are appealing to Judge Vinson because the action of the Bureau of Internal Revenue is directly opposed to this objective."

Parson's First Report

Reporting to the committee for the first time, Claude P. Parsons, new PAW director of materials, warned that while it has been possible to keep the supply of new materials in balance with an increasing petroleum program, there are no indications that the supply situation is sufficiently easy for restrictions to be lifted at any faster rate.

"It must be remembered that our military forces have not yet engaged in the major European campaign, and until the outcome of that campaign is known the future status of materials is in extreme doubt," he explained.

"There are claimant agencies which have not been afforded the same degree of essentiality or urgency as the petroleum program, and which therefore have been repeatedly turned down on programs which they have submitted. They are eagerly waiting to claim any materials made available by a cut-back in miltary requirements.

"In general, there is a definite downward trend now indicated for the third quarter. However, with diligent action, we believe that sufficient materials can be made available for the presently proposed petroleum production program in that period."

Parsons gave the committee an "across the board" survey of the materials situation, important, he said, because PAW now is processing the formal program of third-quarter requirements of controlled materials. His survey showed that the trend of total steel-ingot capacity in the third quarter will be downward, with a net decrease estimated at 10 percent; the total steel-casting production will be approximately 5 percent less; production of pipe is close to the maximum—with first-quarter output 279,650 tons against an estimated capacity of 285,000 tons—and it is figured that similar amounts can be had in the second and third quarters; backlog of orders for tool joints is 220,000, or 29 weeks of productive capacity (7500 weekly) but additional facilities will increase output to 8500 weekly by June 1, although this will no more than offset steadily increasing requirements, if the present trend continues; difficulties are being experienced in supporting stocks of wire rope in sufficient quantities to meet present demand, because of military needs, but most petroleum operator demand has been met; there is a definite shortage in rock bits, with no immediate relief in sight unless manufacturers, already working at full capacity, get cancellation of war contracts; there is no prospect of any immediate increase in production and delivery of drilling equipment such as rotary tables, draw works, etc.; copper supplies will be reduced in the third quarter, with wire most seriously affected by the lack of insulation, followed by copper-base alloy tubing and pipe; aluminum supplies will be available to meet requirements.

A resolution was adopted by the Council approving Dr. F. H. Lahee's definitions of exploratory drilling terms.

Equipment Buyers Urged To Tell PAW of Needs

Oil operators and distributors of oil-field equipment are being urged by PAW to place their orders for 1945 requirements of new internal-combustion engines without delay, in order to participate in an officially sponsored program.

PAW officials emphasized that distributors and equipment manufacturers should place orders now for engines required through 1945, and so far as possible operators should place orders for engines for the same period with their suppliers.

Distributors are to build repair-part stocks up to a satisfactory working level during 1944 on a special program approved by WPB for the year and are to maintain this level by means of AA-1 ratings under P-98-b when repair parts are sold for use.

Operators will be called upon to discontinue the holding of abnormal parts stocks as those of distributors become satisfactory, and close cooperation to that end will be sought between operators and distributors.

Northern Ordnance Inc. Classifies Wildcat Tests

Information covering results and types of wildcat wells drilled by Northern Ordnance Incorporated, through April of this year, has been released by H. L. Scott, Tulsa, in charge of oil exploration and development activities.

Of 109 wildcats completed, 22 were producers of oil or gas or both, 24 were drilled on subsurface information, with 9 discoveries. Detailed surface mapping was responsible for the location of 12 of the tests, of which 6 were successful. Stratigraphic trap tests accounted for 32 of the exploratory wells, 5 of which were successful. Core drill information resulted in 12 dry holes and 1 producer. The drilling of seismograph prospects has so far resulted in 27 dry holes and 1 discovery (Victoria). Part credit for this seismograph discovery is given to preliminary subsurface and stratigraphic trap studies.

Regarding the test drilled on core studies, Scott explained that areas involved lie in Rooks and Graham Counties, Kansas, where near-surface structure does not reflect or conform to structure in the deeper rocks, as might normally be expected in the majority of prospect areas.

The 109 wildcats reported have been drilled in 14 months, 14 states—from Montana to the Gulf, and from New Mexico to Illinois.

Distribution Procedure For Supplies Streamlined

Reorganization of PAW streamlining the procedure for supplying and distributing products on the East Coast swung into action May 1, under an amendment of Directive 59 dividing between two committees the duties that formerly were imposed upon a single supplies and distribution subcommittee.

The two new industry committees are a supply and transportation committee which will be responsible for the movement of products into East Coast supply terminals, and a distribution and marketing committee responsible for the division of that supply among the oil companies.

Allowable Rules Delayed By Mississippi Commission

A suggested amendment to prescribe allowable pull for each well in the Heidelberg field was discussed in detail but no action taken by the Mississippi Oil and Gas Commission last week. Officials felt that such action is not necessary at the present.

Surface casing regulations for the Heidelberg field were adopted in line with proposals distributed for study when operators met with the commission a short time back.

Northern Ordnance Has Good First Year Record

Company now operating in 15 states with wildcatting mark 26 percent successful; has opened 16 new fields, 4 major finds

By DON L. CARROLL, Staff Writer

AFTER slightly more than a year of intensive exploratory endeavor, highlighted by an initial run of wildcat failures, Northern Ordnance, Incorporated, has made an auspicious record in recent months, to qualify as a successful operating oil company.

Drilling operations were begun in March, 1943, and during that month 14 wildcat wells were started on farm-out properties acquired from one of the major companies. In ensuing weeks, 13 of these wells were completed as successive dry holes. The fourteenth well, however, opened the Briggs pool, in Lincoln and Okfuskee counties, Oklahoma, and since that time the company has posted a splendid record of wildcat hits, resulting in the discovery of 16 fields, four of which are conceded to be important strikes.

Up to April 15, 1944, the company had acquired 109 blocks of acreage in 15 states and had drilled test wells on 72 of them. All but 2 of the blocks were in wildcat territory. Of the 70 wildcat ventures, 18 were completed as successful producers, for an overall average of 25.7 percent, a figure considerably above normal expectations.

Unusual Company Policies

Although the drilling program of the company is backed by ample funds, operations are carried on with a minimum number of employes, all of them hand-picked. Geologists, engineers and other technical personnel have full authority to use their own judgment in making decisions during drilling operations, or, at any rate, to resort to no more than an exchange of telegrams or a phone call to headquarters in Tulsa. Thus, red tape is non-existent and drilling operations are not held up pending executive decisions. As a result, the firm has had one drilling operation in progress per employe at all times. There were 52 employes on the payroll in March and April. An accompanying table gives data on the company's drilling operations and personnel for the 13 months of its activities through March, 1944. At the beginning of March, 1944, the concern had 39 wells drilling. This had increased to 66 by the end of April.

Major Fields Opened

Of the four major fields so far opened by the Northern Ordnance firm, the Victoria field in Victoria County, lower Texas Gulf Coast, and the Woodbine field, Cooke County, North Texas, are considered the most promising. In the Victoria discovery well 6 fingering sands were logged in the Wilcox section, carrying gas, gas-distillate and oil pays. Two development wells, drilling on April 15, were expected to pin down the best oil pay in the series, with gas-oil ratios to be reduced by shut-offs. The discovery well was flowing 123 barrels of clear white distillate through tubing choke, with 40,000/1 gas-oil ratio. Single well reserve was estimated by H. L. Scott, company manager, at from 15 to 20 million barrels.

Four excellent Strawn pays were found in the Woodbine discovery. Five of the six additional wells nearing completion in the field on April 15 were given drill stem tests on that date, confirming them as good producers. A northeast offset to the Strawn discovery well was carried down to the Ellenburger, which was found to be dry. The well was plugged back and perforated at the Strawn level, and the field will consequently be developed as a multi-pay Strawn area.

A third major field is the Big Springs, in Howard County, West Texas, where several wells in the Morita-Big Springs area have confirmed large reserves in the San Andres (Permian) Lime at shallow depth.

On the basis of three wells drilled on the Gage Dome structure, in Musselshell County, Montana, excellent production has been found in the Amsden Limestone. The structure has been found to have closure in the Amsden pay amounting to at least 215 feet, indicating that some 6000 acres will be proved for production there. A four-mile pipeline is being laid to loading racks, and oil will be run from the field by gravity flow.

Rely On Geology

While both the Victoria and Gage properties were acquired as farm-out deals, the company's experience with farm-outs has been generally disappointing, and its present policy is to avoid such commitments in favor of prospective areas recommended by consulting geologists. Geophysical surveys are being made to check geological results but not for the preliminary outlining of structure, for the reason that the company has drilled 31 holes on seismic information with only one hit (Victoria). By comparison, 39 wildcats were drilled on straight geological indications, with 17 successful completions. At the present time about two thirds of the company's exploratory studies comprise surface and sub-surface geological work to establish structure. Much of its remaining effort is devoted to the pinning down of stratigraphic traps, particularly in Mississippi, South Dakota and Montana. In the latter state the objective is the tracing of the Cutbank sand in the Sweetgrass Arch area. This sand is the lowest of three known pays in the Kootenai series, of Lower Cretaceous age, and lies immediately above the Ellis formation in that locality. Stratigraphic trap plays account for some 10 percent of the company's current exploratory activities.

Up to April 15 this year, 37 of the 109 blocks acquired by Northern Ordnance had not been tested.

Company Record

The company, on April 15, owned 29 blocks in Texas, of which 18 had been tested and 11 had not been tested. Of the 18 Texas blocks tested, 7 had resulted in field discoveries and 11 in wildcat failures. In Oklahoma, Northern Ordnance owned 24 blocks, of which all but 8 had been tested. Of the 16 Oklahoma blocks tested, 3 had resulted in field discoveries and 13 had been dry. The company owned 18 blocks of acreage in Kansas, and had tested 17 of test; finding 2 new fields with the 17 wildcats. All nine of its Montana blocks had been tested, with 4 discoveries or producing wildcats resulting. Three of the five Illinois blocks had not been tested, the two that had been drilled were unsuccessful. Two blocks in Louisiana were owned, one of which had been unsuccessfully tested.

The company has been active in Ohio, leasing 11 blocks. Only two of its Ohio blocks have been tested, and both were failures. A test in North Dakota was unsuccessful, as was one in South Dakota. The company still has a block in South Dakota that had not been tested. Two of its three blocks in Arkansas were tested, both unsuccessfully. In addition the company had drilled a wildcat failure in Wyoming, Mississippi, and New Mexico; besides holding an untested block in Tennessee.

The company recently acquired large stripper production holdings in Pennsylvania, and plans extensive experiments in secondary recovery work. These will include the sinking of a new type mining shaft.

Trend of Northern Ordnance, Inc., and John B. Hawley Operations

	FOOTAGE		WELLS STARTED		Wells in Operation First of Month	Accumulated Employes by Months	Footage per Employe
	Footage by Months	Accumulated Footage by Months	Wells by Months	Accumulated Wells by Months			
1943							
February	.....	.....	..	..	..	1	.....
March	38,527	38,527	14	14	..	3	12,850
April	47,600	86,127	10	24	14	3	15,850
May	33,391	119,518	5	29	23	6	5,570
June	42,338	161,856	12	41	18	7	6,050
July	30,178	192,034	9	50	16	9	3,350
August	50,459	242,493	14	64	22	11	4,580
September	58,584	301,077	17	81	34	18	3,250
October	55,282	356,359	21	102	39	20	2,760
November	62,572	418,931	16	118	34	22	2,860
December	49,733	468,664	7	125	32	25	1,985
1944							
January	40,661	509,325	11	136	30	34	1,192
February	48,063	557,388	14	150	31	40	1,200
March	86,984	644,372	17	167	39	52	1,670

Preparation and Use Of Casing Selection Charts

An outline of the practicability and versatility of casing selection charts in casing string design, their usefulness in clearing up operating questions, and how to prepare them

By H. M. COOLEY,
Manager, Field Engineering, Tubular Products, Bethlehem Steel Company,
Tulsa, Oklahoma

THE INCREASING use of casing selection charts in casing-string design by oil-company engineers makes desirable a presentation which will simplify the method of preparing the charts, and which will acquaint others with this manner of handling casing-string design. The favorable reception which a discussion of this subject received at a meeting of the Petroleum Engineers' Club of Dallas on February 25, 1944, indicates that a more comprehensive, carefully prepared treatment of the subject should be of great value in solving casing-string-design problems.

Each detailed step in the preparation of a casing selection chart will be developed in this article, to clarify the method of procedure. Contrary to general belief the preparation of such a chart is not especially difficult, provided the various steps are followed in logical order. Although calculations may be tedious, it must be remembered that once they are made, and charts prepared, the casing question is settled for good, except where changes in policies may call for revisions or recalculations. It will then no longer be necessary to go through the calculations each time a casing string is required for expanding production.

Certain assumptions or conclusions must be made before the chart is started. For example, company policy with respect to safety factors must be decided upon. Also, where there are several methods for handling some of the design factors, the one must be selected which best meets the ideas of those responsible for casing-string design. An example is the question of whether to give consideration to the effect of tension stresses in reducing collapse resistance of casing. If the decision is affirmative, the method by which this consideration will be given, as well as its magnitude, must be decided upon. A further factor which may or may not be given weight in preparing a chart is the buoyant effect of drilling mud in reducing the tension stresses in the string. The question of limting the number and length of the sections in a casing string will also require an answer. The form of the finished chart will be appreciably affected by these decisons.

In the Dallas presentation, the fol-

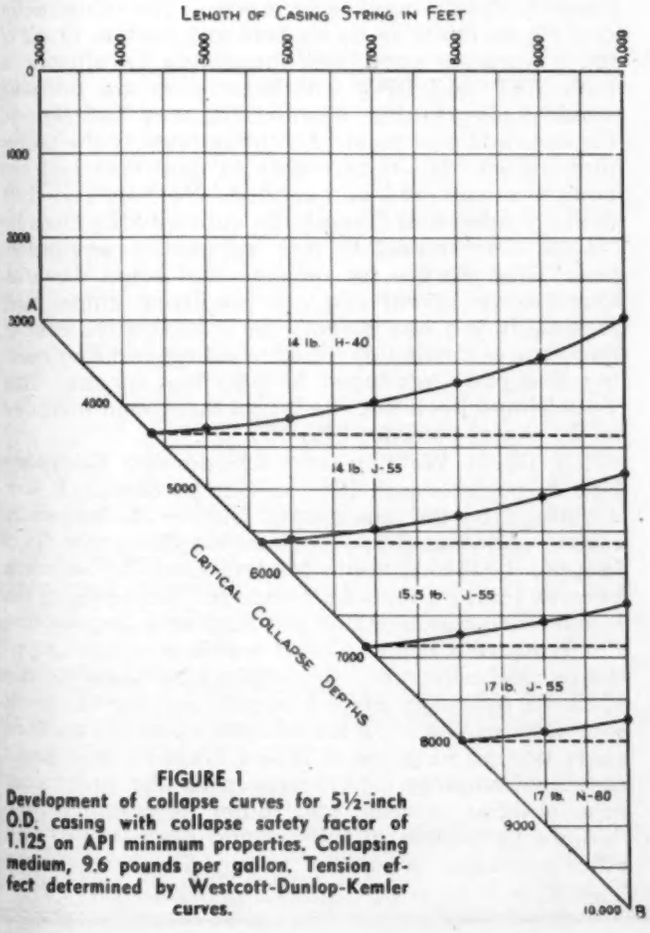

FIGURE 1
Development of collapse curves for 5½-inch O.D. casing with collapse safety factor of 1.125 on API minimum properties. Collapsing medium, 9.6 pounds per gallon. Tension effect determined by Westcott-Dunlop-Kemler curves.

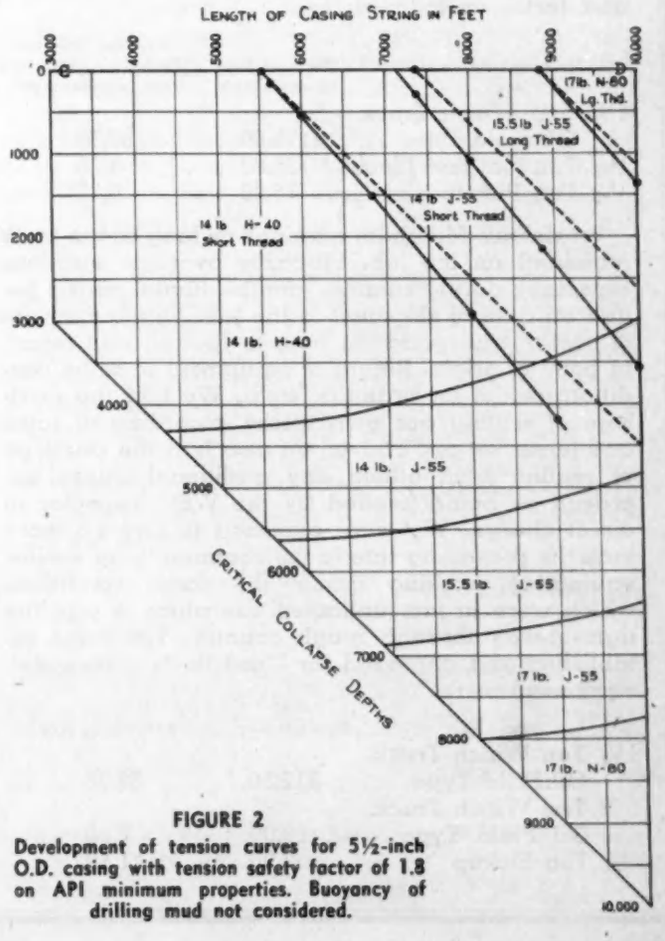

FIGURE 2
Development of tension curves for 5½-inch O.D. casing with tension safety factor of 1.8 on API minimum properties. Buoyancy of drilling mud not considered.

Anderson Brothers

This is an explanation of charges brought concerning certain phases of our contractual relationship with War Emergency Pipelines, Inc., as agent for Defense Plant Corp. We feel we have not done anything wrong or against the best interest of the government and want our friends in the industry to understand fully the facts in the case.

Federal Agents made an exhaustive examination of our records covering every phase of our relationship as a contractor working under direct supervision of War Emergency Pipelines, Inc., Agent for Defense Plant Corporation. An indictment followed and listed below are all the charges contained therein set forth in part and explained as follows:

Charge: Defendant unlawfully received reimbursement for money paid by Anderson Brothers to Allied Welding and Engineering Company covering rental of winch trucks at the prevailing rate of $12.50 per day whereas the billing should have been figured on the basis of $175.00 per month by reason of the fact that defendant, a partner in the Allied Welding and Engineering Company, was equal to the sole owner of the company.

Explanation: Carl C. Anderson, an individual, and Anderson Brothers owned numerous trucks, all of which were included in a rental contract, Form ERA-100, provided by DPC and which contained rates and terms as follows:

Item	Minimum Rate for one month	Overtime Rate for Excess over 240 hours in a calendar month
1½ Ton Winch Truck, Oil Field Type	$175.00	$0.36
1½ Ton Flat Bed Truck	125.00	0.26
½ Ton Pickup	75.00	0.16

Provisions: Minimum earnings as long as the truck remained on the job. Probably overtime earnings especially during summer months. Rental period began on date of shipment to the job. Reimbursement of cost of transportation both to the job and return to point of origin. Return of equipment in same condition except for ordinary wear. We had the privilege of renting our own trucks according to rates and terms set out above; we also had the privilege of renting from others any additional trucks approved as being needed by the WEP Inspector in direct charge. We were expected to pay no more than the prevailing rate in the community for similar equipment working under the same conditions which were in fact unlimited use along a pipeline right-of-way through rough country. The rates established and approved for Third Party automotive equipment were:

Item	Rate per Day	Rate per ½ Day
1½ Ton Winch Truck, Oil Field Type	$12.50	$6.25
2 Ton Winch Truck, Oil Field Type	15.00	7.50
½ Ton Pickup	3.00	1.50

Provisions: Time was paid only for actual days or half days worked and approved by WEP timekeeper, not the contractors' employee. Operator, gas and oil were only items of expense paid by WEP. No repairs were allowed regardless of why they became necessary and if the truck broke down, or was wrecked, or became unfit, it was immediately taken off the payroll. No transportation costs to or away from job allowed. No rental contract of any nature was required for Third Party automotive equipment. Trucks when they were needed and if they could be obtained were approved or rejected by WEP Spread Inspector; an operating number was painted thereon and they were put on and taken off a weekly payroll in exactly the same manner that an employee would be carried and paid for the number of days he actually worked.

The two arrangements explained above allowed the Contractor the privilege of renting his own equipment according to provisions of his rental contract, Form ERA-100 mentioned above. The Contractor could if he chose to do so, rent any portion or all of the equipment used, and according to officers of both WEP and DPC, whichever plan we adopted would be agreeable inasmuch as they had figured the resultant cost would be comparatively the same; furthermore, that a difference in final cost had not been contemplated or intended. We believed from the beginning that it would be substantially cheaper for the Government to rent automotive equipment from Third Parties for reasons that seem obvious. Our records reveal that our prediction came true. In fact, during two months the comparative cost of three trucks carried as Allied Welding and Engineering Company produced $600.00 less income than would have been the result had they been included in the rental contract ERA-100.

The Allied Welding and Engineering Company had its beginning in 1941, at Salem, Illinois. It was organized by the sole owner, Claude M. Anderson, who operated as Allied Engineering Company. As of January 1, 1943, Claude M. and Carl C. Anderson became joint partners and changed the name of the former company to Allied Welding and Engineering Company. We contemplated welding contracts primarily and solicited only welding business during 1943. Three trucks owned by the partnership were rented for use on WEP job and were carried on third party payroll in name of Allied Welding and Engineering Company. They were paid the prevailing rate without repairs and other limitations. We thought by reason of the existing partnership, any other procedure would be wrong. The trucks were

Answer Indictment

properly designated by name and number painted thereon. Our personal interest in the partnership was known to the Government Inspector and Timekeeper on every section the respective equipment worked on. The Court conceded existence of the partnership but ruled nevertheless, that our procedure had been wrong inasmuch as I had an interest in the partnership known as the Allied Welding and Engineering Company. It seems we should have included the partnership trucks in the ERA-100 rental contract. Furthermore, the fact that the final actual expense to the Government might have been less was not relevant. All things to the contrary notwithstanding, we were not within the confines of the law. In view of these conclusions of law the Court accepted our plea of nolo contendere on this charge.

Charge: Defendant concealed existence of purchase option clause in rental contracts for certain equipment procured from Fabrick Tractor Company which amounted to benefit of having rentals applied on purchase or receiving compensation not contemplated by his governing contract with DPC. Dismissed.

Explanation: Our first contract with WEP comprised a section of Big Inch through Arkansas. At that time, construction from Longview, Texas, only to Norris City, Illinois, was contemplated, and this portion of the Line was completed in 1942. This limited project did not require the elaborate procedure that finally came into existence during 1943, and after construction proceeded by later authority. We operated from July to December, 1942, by authority of a Construction Contract which did not contain certain provisions that were in later contracts signed in 1943 for other sections. During 1942, we were not asked to file a rental contract of any kind either for our own equipment or for rented equipment. During 1942, we employed of our own accord, rental contracts some of which had purchase options therein. We served the WEP with written notice of our action. We understood then and even to this date, we are told that WEP has no interest in this action nor its result. Our right in those contracts to purchase the equipment within a limited time depended solely on our having made payments when they became due. Actually, all these contracts were vitiated and were of no consideration when particular equipment was purchased a year later "as is where is" and for a price that did not exceed 55% of OPA limit. We were ready and able to present proof that we had not done anything outside authority of the contract and the knowledge of the WEP. The court dismissed this charge.

Charge: Defendant unlawfully presented invoices for reimbursement of rentals paid to E. W. Werner Motor Company and to J. H. Ziggenfuss for winch trucks; said rental being figured on basis of $12.50 per day as provided for Third Party Trucks, whereas contract between respective parties was deemed by the Prosecution to be a Sales Contract, in consideration of which Defendant should have treated the equipment as being owned. Dismissed.

Explanation: We had rental contracts for the trucks which included an option to purchase, the phraseology of which is known and referred to by the oil and gas industry as rental recapture provision. We were prepared to explain this practice which amongst our own trade folk is an established and perfectly legitimate way of dealing. The Court dismissed this charge.

Our case did not proceed to the point of calling a single defense witness although numerous officials who would testify in our behalf were on hand. It is still beyond our comprehension that there could be a single instance wherein we have done anything wrong or even not for the best interest of the Government. We solicited and enjoyed the benefit of a strict and comprehensive supervision of officials entrusted with full authority to instruct and approve our actions. It was not and cannot be shown that we did not comply with instructions or failed in our duty. We are proud of our contribution to a magnificent and successful venture which our Government has been able to accomplish. We are proud of a Government citation for a job well done that hangs in our office. We hold no grudge for having been the first contractor to be investigated and audited. We do hold that we have not committed any act outside the knowledge of our supervising authorities and beyond the control of a post audit which still is not completed, and which we always understood would involve every item and amount to a final approval or rejection. Only the vagaries of law could possibly prevent one from acting accordingly but with impunity. I have always found safe guidance and ample protection afforded by the "Golden Rule." I shall continue to depend upon it in future relationships with my fellowmen.

CARL C. ANDERSON

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lowing assumptions and decisions were arbitrarily made:

1. Casing size 5½-inch (outside diameter).

2. Setting depth properties, and casing weights and grades, were taken from API code 5-C-2, second edition.

3. Safety factor in collapse, not less than 1.125 on the minimum API properties.

4. Safety factor in tension, not less than 1.8 on the minimum API properties.

5. Collapsing medium, 9.6 pounds per gallon.

6. No consideration was given to the buoyant effect of drilling mud.

7. Reduced collapse strength due to tension stresses was determined by the Wescott - Dunlop - Kemler "Effect of Tension" curves, as shown in API Drilling and Production Practice, 1940, page 138.

8. The demonstration stopped at 10,000 feet, but the method can be expanded to greater depths, if desired.

In this presentation the same factors will be used and essentially the same chart will be developed.

Collapse Considerations

Figures 1, 2, and 3 show various steps in development of the chart in logical order. In figure 1, the line A-B represents pictorially the depth of wells, or the length of casing strings, from 4000 to 10,000 feet. The space below A-B can be used for notations of safety factors and other fundamentals used in preparing the chart. The first step is to determine and to locate on A-B the points representing the setting depth in collapse, using the factors decided upon, for each of the available classes of casing. The API collapse-resistance figures listed in each case are multiplied by 2 to change from collapsing pressure to feet of setting depth, because each pound of collapsing pressure is equivalent to 2 feet of depth of 9.6 pound per gallon fluid. The result is then divided by 1.125, the agreed safety factor. Resulting figures are now plotted on A-B, as follows:

4340 feet for 14-pound grade H-40 casing
5640 feet for 14-pound grade J-55 casing
6860 feet for 15.5-pound grade J-55 casing
8000 feet for 17-pound grade J-55 casing
10,470 feet for 17-pound grade N-80 casing

The 17-pound grade N-80 casing depth falls off the chart, but is listed to demonstrate that this casing is satisfactory to 10,000 feet, the limit of the chart.

Sample Reading

Having determined the critical collapse depths for the casing, it is apparent that a simple chart can be prepared by drawing horizontal lines from each setting depth. (Dotted lines, Figure 1.) Casing strings for various depths of well can now be read directly from the chart. For example, for an 8000-feet well the casing string would be:

4340	feet	of	14-pound H-40
1300	feet	of	14-pound J-55
1220	feet	of	15.5-pound J-55
1140	feet	of	17-pound J-55
8000	feet		

This would be a satisfactorily selected casing string, as far as collapse requirements are concerned, if no consideration were given to the effect of tension stresses in reducing the collapse strength of casing, but we have already decided to use the Wescott-Dunlop-Kemler method for correcting collapse strength. Up to 4340 feet there is no correction to be made, but for strings of greater length, the collapse strength at the bottom of the 14-pound H-40 section is reduced due to the weight of the 14-pound J-55 casing, and for some of the greater depths, due to the weight of several sections, all of which are attached to, and stress in a longitudinal direction, the bottom section of the 14-pound H-40. At greater depths, the collapse strength of each of the intermediate sections is also similarly reduced. To make these corrections on the chart with least possible duplication the bottom section should be recalculated first. Corrected depths then can be used for each higher section of the string.

17-pound J-55 Section

Take now the 17-pound J-55 section. No correction need be made at 8000 feet, as there is no casing below the critical collapse depth at that point. At 9000 feet, however, 1000 feet of 17-pound N-80 is suspended thereon. Reference to the "Effect of Tension" curves agreed upon shows that 1000 feet of equivalent length on the bottom of J-55 casing reduces its collapse strength by 1½ percent, or, in this case, by 120 feet. At 10,000 feet, similarly, the reduction is 3 percent, or 240 feet. Plotting the reduced collapse strengths on the chart gives the corrected figures for 17-pound, J-55 casing, and also the solid line rising above the horizontal line from 8000 feet depth. The horizontal dotted line is now eliminated. At this point a precaution must be observed in each calculation; the "Effect of Tension" curves should be reinspected to determine if the lowered collapse strength, and the correspondingly greater amount of casing weight in the lower section, will further lower the collapse strength by a measurable amount. In this case, the effect of the 120 feet of additional casing at the 9000-foot point is negligible, but the 240 feet at 10,000-foot depth results in a further reduction of about 40 feet. The plotted point in the 10,000-foot string should therefore be at 7720 feet, instead of 7760 feet. A second reinspection of the "Effect of Tension" curves may be made at this point for cumulative effect of further losses of collapse strength. However, unless the equivalent length of the lower sections approaches the critical collapse depth under consideration, the second reinspection is hardly necessary.

Proceeding to the 15.5-pound J-55, and following the same method of calculation, remembering that each section of 17-pound below it must be calculated to equivalent length of 15.5-pound casing, the loss of collapse strength for 8000, 9000, and 10,000 feet is respectively 120, 260, and 410 feet. These figures, upon reinspection of the "Effect of Tension" curves, become 120, 290, and 480, approximately, and are plotted to form the solid line which rises above and replaces the horizontal line at 6860 feet, as shown in Figure 1.

Same Calculation Method

Similar recalculations of the collapse strength for the 14-pound J-55 casing at 5640 feet, and the 14-pound H-40 casing at 4340 feet give the following approximate reductions of collapse strength at the depths shown:

	14-Lb. J-55	14-Lb. H-40
At 5000 ft.	None	60 ft.
6000	30 ft.	190
7000	140	370
8000	320	600
9000	560	920
10,000	810	1350

When these reductions in collapse strength are plotted to form the solid lines for their respective grades, they replace the horizontal dotted lines and form a uniform pattern of collapse strengths.

Tension Considerations

Next steps in development of the chart are to determine and plot the limiting or critical tension depths. In Figure 2, along the horizontal line C-D, the setting depths in tension are plotted,

■ CONTINUED ON PAGE 58

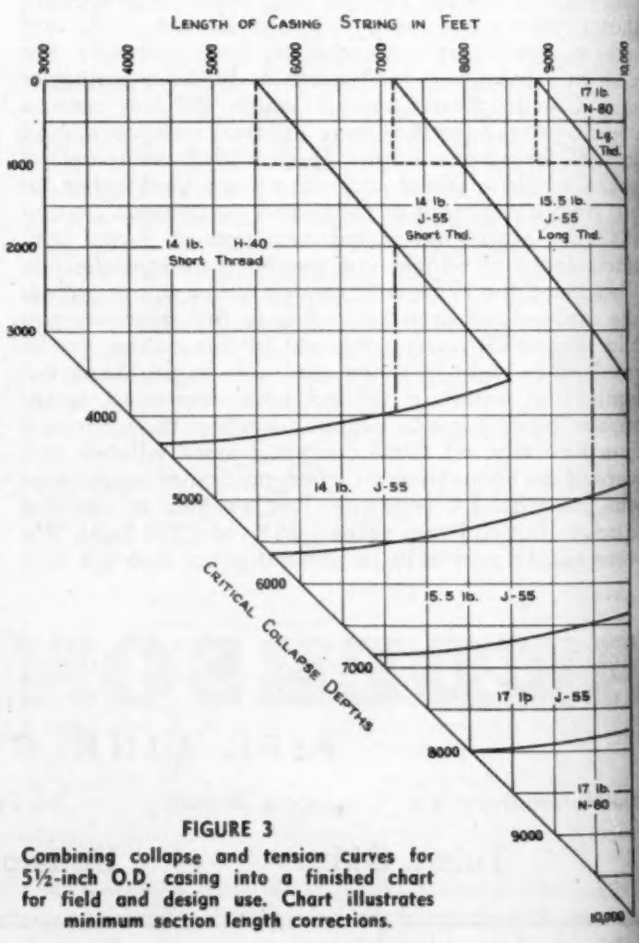

FIGURE 3

Combining collapse and tension curves for 5½-inch O.D. casing into a finished chart for field and design use. Chart illustrates minimum section length corrections.

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Gamma-ray logging—a noteworthy contribution toward solving problem of obtaining correct depth measurements in these days when trend in oil production is toward the development of relatively thin reservoirs at greater and greater depths

Use of Gamma-Ray Logs In Measurement Problems

By G. FREDERICK SHEPHERD,
Geologist with Wm. Helis, New Orleans, Louisiana

THE problem of obtaining correct depth measurements has been receiving considerable attention in recent years because of the present trend toward development of relatively thin reservoirs at greater and greater depths. Discrepancies in measurements continue to appear, however, even in shallow holes often creating serious problems in well completions.

While not necessarily solving the problem of measurement, a noteworthy contribution toward its solution has been made by gamma-ray logging, by which a record of a well's lithology may be interpreted from a log which reflects changes in gamma-ray emanation. Inasmuch as this log can be made after casing has been set, any given point may be located in respect to a new or plugged-back bottom under conditions which permit no other logging method to be used. Where a discrepancy is shown to exist between electrical log measurements made in open hole and those of a gamma-ray log made through casing, the use of the latter can lessen the danger of testing a sand at the wrong depth by reducing the measurement requirements to a minimum, which is the distance above the well bottom as established by the gamma-ray log. If such a discrepancy exists between the two sets of measurements, either one may be right and the other wrong, or both may be wrong; both can not be right. Therefore, the problem in respect to well completions resolves down to determining the position of the object sand on the gamma-ray log and then to determine its distance above the gamma-ray total depth.

Experience with many measurement problems resulting from discrepancies between electrical log measurements and drill pipe measurements, which have been handled by use of gamma-ray logs, has developed certain conclusions pertaining to the method of interpreting gamma-ray logs and determination of correct completion depths.

Multiple Series Needed

Contacts between different lithologies may reflect in an unlike manner on different types of logs and correction factors based on such contacts would

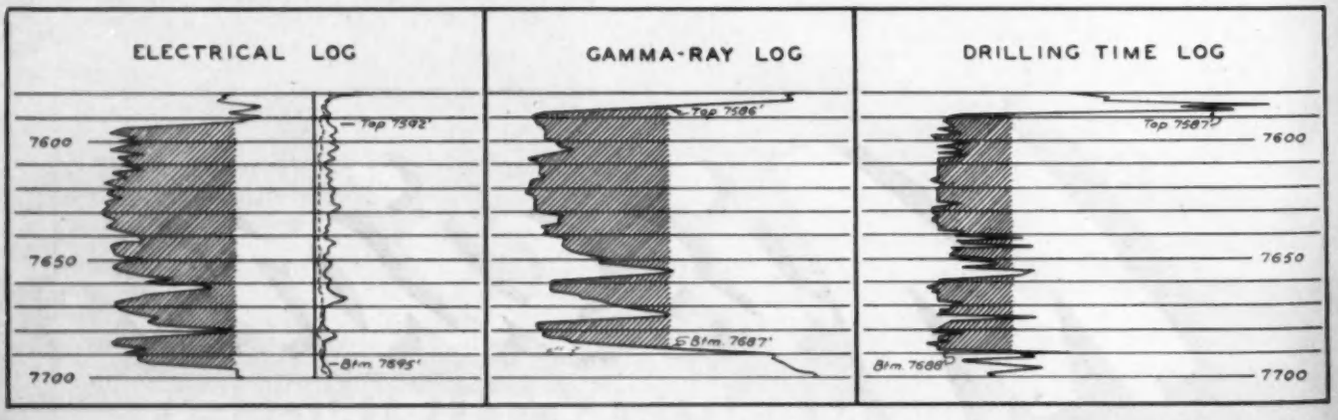

FIGURE 1 (Wm. Helis' 1-B LSU, University Field.)

Logging Characteristics in Sand. Electrical, gamma-ray, and drilling time logs depict similar curves from which lithology may be interpreted.

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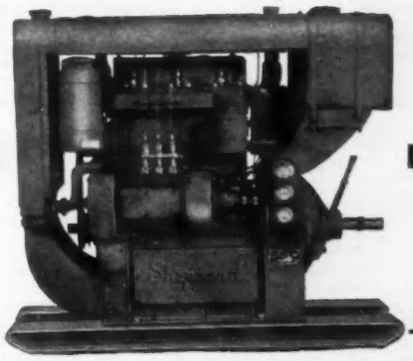

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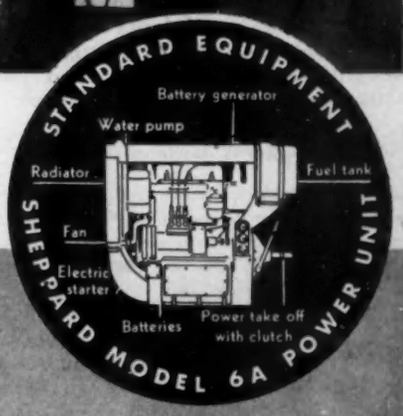

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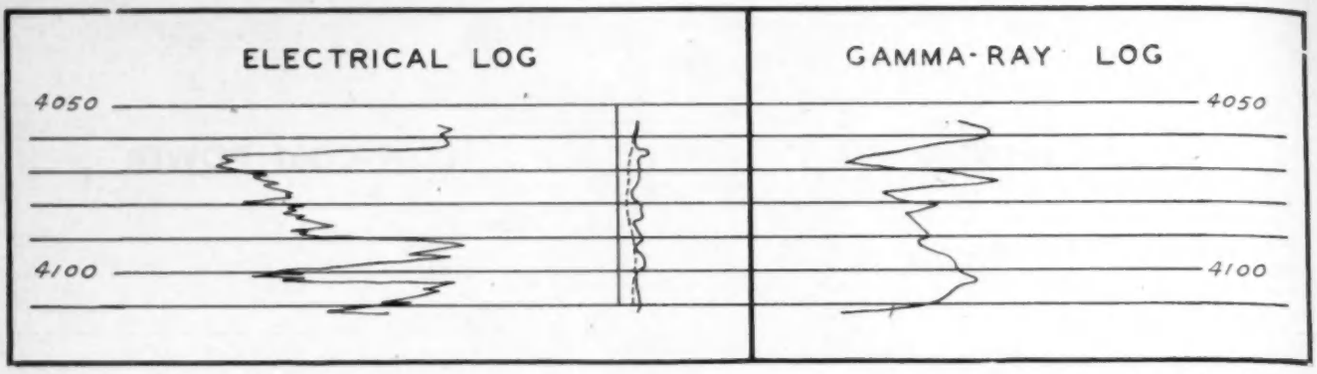

FIGURE 2 (Wm. Helis' Duplantier C-1, University Field.)

Disagreement between Electrical and Gamma-ray Logs. Radioactive and electrical potential properties do not always coincide. Note absence of 4100-feet sand on the gamma-ray log.

be misleading. Therefore a multiple series of readings are necessary to determine the correct factor to be applied. It has been found also that certain types of correlation points are more reliable than others, probably as the result of the depositional environment of rapidly changing sedimentation which would produce erratic distribution of radioactive minerals. These points are discussed below with comments on their relation to the multiple series of readings. Other errors that might enter the measurement problem in respect to interpretation of gamma-ray logs may be the result of instrumental limitations which cause a time lag to occur between the moment of high gamma-ray bombardment and the moment a change in the emanation is actually plotted on the log. Allowance for such errors is also brought out in the forthcoming discussion.

It has been demonstrated in many cases that discrepancies between electrical log and gamma-ray log measurements are not uniform or consistent throughout the length of section surveyed. Changes in the correction factor are frequently found to take place between different runs of the electrical log and also within a single run, in some cases coinciding with depths at whcih resets for cable stretch are made, and in other cases the result of differences between conditions encountered in open hole logging and logging inside casing. Thus the position of the object sand should be located on the gamma-ray log in respect to the new well datum inside the casing. This paper outlines the empirical method used and summarizes the conclusions reached.

Logging Characteristics

A subsurface formation not sampled by coring must be examined and studied by observation of those properties revealed in drilling and logging. The rate of penetration by a bit may be measured and a log plotted which gives a diagnostic pattern descriptive of the rock's penetrability. The same rock has certain inherent electrical potential charatceristics which are measured and the resultant potential log has a pattern likewise diagnostic and descriptive of the rock's electrical potential. It possesses also radioactive minerals which emanate gamma-rays that can be detected and recorded producing another diagnostic log. While all these properties are unrelated as to their origin and physical nature, the curves describing these properties will in most cases have similar characteristics. Three such logs of a typical sandstone in University field, Louisiana, are shown in Figure 1. In all three cases the sandstone (shaded) is indicated by a curve or "kick" extending to the left of a common shale base line. These logs are not corrected for measurement discrepancies.

Sources of Error in Correlation

Unfortunately the radioactive and electrical potential properties no not always coincide, as illustrated in Figure 2. The emanation of gamma-rays is a direct reflection of the distribution of radioactive minerals in the rock and does not reflect any other property or constituent of the rock. The electrical potential log is caused by electrochemical phenomena which result from the difference between the characteristics of bore hole fluid and formation fluid rather than from any physical property or constituent of the rock itself. Drilling time responds to a rock's hardness and the manner of compaction and frequently will aid in identifying a lithology when used in conjunction with other types of logs. This may be stated more emphatically by saying that the gamma-ray log is the only method of logging today which actually responds to any lithologic constituent, since it is produced by a mineralogical part of the rock, whereas electrical potential logging reflects fluid conditions incidental to lithology and drilling time likewise responds to a physical property of a rock and not to any constituent part of it. In Figure 2 the 4090-foot sand-shale contact is shown clearly on the electrical log, but not on the gamma-ray log because the radioactive and electrical potential properties do not coincide in this plane. In addition, it may be noted that the 4100-foot sand is indicated only in the electrical log and is absent on the gamma-ray log; in other words, in the latter log, the amount of gamma-ray emanation from this sandstone is approximately the same as from the adjacent shales.

Because of the existence of such conferent types of logging, it would be tacts which appear differently in difprecarious to apply a measurement correction based on a comparison of only one contact horizon unless both electrical and radioactive properties happened to change at the actual lithologic contact plane.

Statistical Errors

In addition to the irregular distribution of radioactive minerals accounting for errors in picking a contact plane on a gamma-ray log, errors may occur also because of the difference of opinion among observers as to the exact point at which contact planes are to be picked. Some have asserted that the correct position of the plane between a shale and a sandstone is found at a point one third the distance from the maximum shale peak to the minimum sandstone peak, reading from the bottom up when the log is recorded up the hole. Others claimed that this point is midway between these peaks. Because of the possible statistical error incurred by the fluctuation of gamma-ray bombardment, some have called this contact at the start of the line connecting the peaks, which starting point will be approximately 1/8 inch to 3/16 inch from the peak, varying with the scale used in recording. It is now felt, however, that statistical errors have been reduced to a minimum so that they may be disregarded except on earlier logs. In some cases there may be a considerable difference between the depths assigned to a given horizon when picked by all of these methods. Figure 3 shows a case where the difference amounts to six feet between depths assigned to the base of a sandstone by each of the above methods. The base of this sandstone on the electrical log is at 4931 feet. Thus, the correction factor might be 1 foot, 2 feet, or 5 feet, only one of which could be correct and therefore only one method of picking the point could be correct.

Correlation between electrical and gamma-ray logs for measurement correction determination may be made also by using peaks. This is limited to thin

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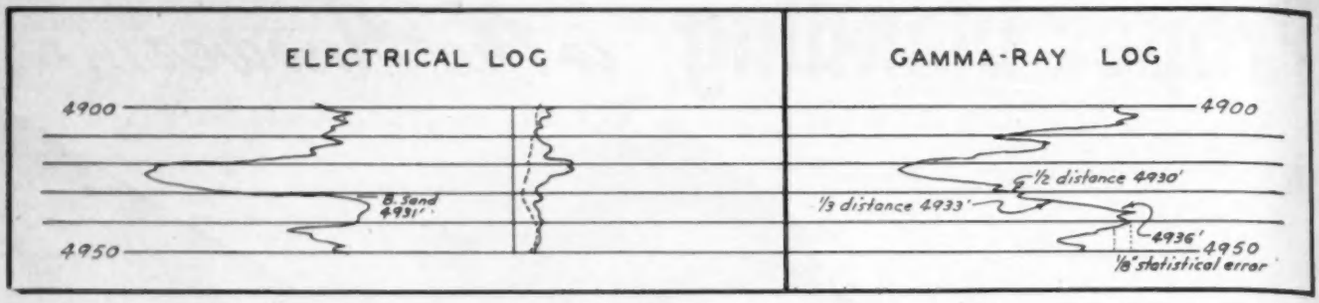

FIGURE 3 (Wm. Hells' 12 H. B. Nelson, University Field.)

Bases for Selecting Contacts of Gamma-ray Logs. Of the three different depths assigned to the 4931 feet sand base by different methods of picking contact point on gamma-ray log, only one can be correct.

beds where the peaks are sharply defined. This method is commonly used because it is easier to make precision readings of the depths and it is also assumed that the peaks will coincide more closely than will contact planes. Figure 4 illustrates a case, however, where this method might introduce an error. Peaks may not always coincide exactly in depth even in relogging on different runs of an electrical survey; therefore, some doubt could be placed as to the correctness of either one. If the movement of the electrode during a survey is not uniform because of its hanging up on hard ledges or because of local zones of mud with varying weight or viscosity, or because of variations in the stretch characteristics of the cable, the depths at which the peaks are recorded may vary. In Figure 4 the correlation between the gamma-ray log and two different runs of the electrical log through the same section is shown indicating the top and base of the sandstone and also the correlation of two shale peaks. Here it will be seen that the correction factor of 6 feet between Run 1 of the electrical log and the gamma-ray log is consistent in all four correlation points, while three different correction factors are obtainable from the same correlation points using Run 2. If, therefore, a correction factor were based on the correlation of a peak where other check points were not available, an error might be introduced if well conditions or cable characteristics caused that peak to be recorded at the wrong depth.

From the above it will be seen that many errors may prevail in correlating gamma-ray and electrical logs. Where a confined zone is to be tested, an error of only a very few feet may be enough to cause a sand to be tested at the wrong depth. In presenting the following method of determining a correction factor, it is believed fair to assume that within a local zone any discrepancy existing must be uniform. Different correction factors may be necessary to apply to different parts of the hole, however, so that the process described should be applied to the entire length of the hole surveyed and not limited to any given portion of it.

Multiple Correlation Method

The empirical method of interpreting gamma-ray for the purposes indicated might be called a method of applying multiple correlating horizons to indicate an exact correction factor to apply between the depths of gamma-ray and electrical logs. A study of many hundred gamma-ray readings has brought out the following basic principles to apply in measuring exact points on a gamma-ray log. They are discussed here in their order of reliability and are illustrated in Figure 5.

1. *Shale Peaks*—Thin shale breaks in a thick sandstone body are the most reliable points to measure on gamma-ray logs. One disadvantage is that such peaks are relatively infrequent and within a limited zone of a log they may be entirely absent.

2. *Sandstone Peaks*—Thin sharply defined sandstone peaks are generally reliable where positive identification is made with the electrical log. Accuracy of these peaks will vary at times, probably because of the irregular distribution of radioactive minerals in rapidly fluctuating deposition.

3. *Sandstone Tops*—Tops of sandstones should be measured at one-half the distance between the minimum "sand kick" and the maximum "shale kick," unless there is a definite break in the line indicating where the ionization chamber has passed through the contact. This point will be discussed below. Sandstone tops are less reliable than those readings of shale or sandstone peaks, but in multiple series with other readings will be found helpful.

4. *Shale Tops*—Contrary to a conception widely held, the bottoms of thick sandstones, or tops of shale beds, are the poorest points to use in measuring

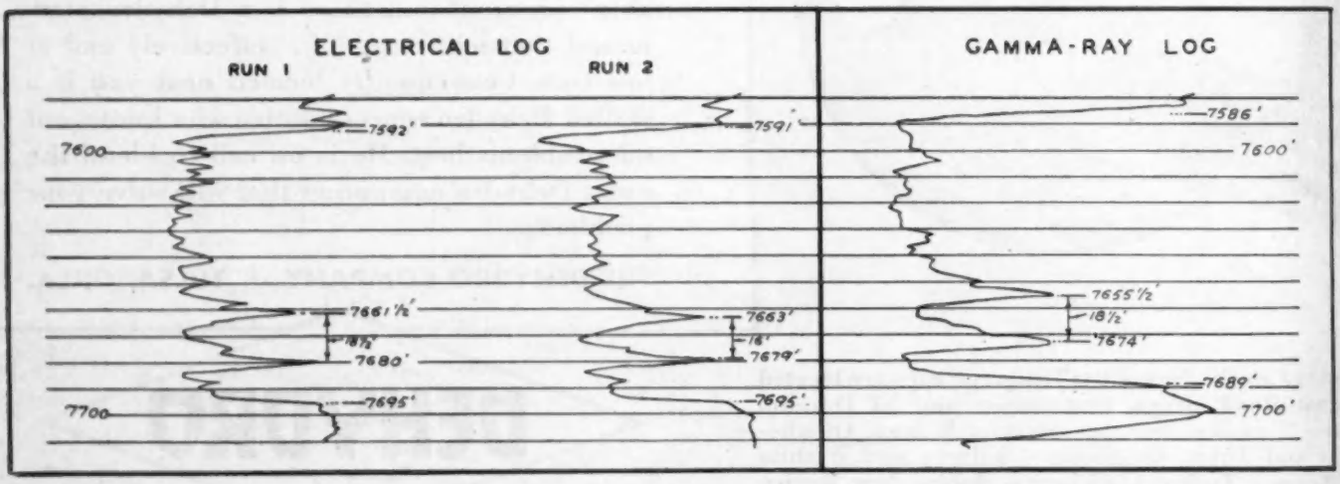

FIGURE 4 (Wm. Hells' 1-B LSU, University Field.)

Variations in Depths on Electrical Logs in Rerun Section. Shale peaks 2½ feet closer on second run than when first logged. Correction for measurement based on gamma-ray correlation with second run would introduce errors.

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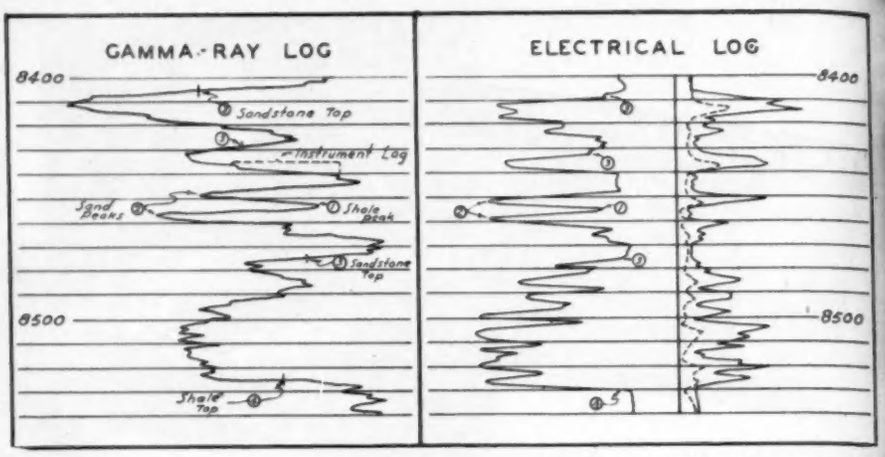
gamma-ray contracts. When they must be used because of the lack of other points, the top of a shale should be measured in the same way as the top of a sandstone, that is, midway between the peaks, subject to the same conditions as mentioned above when there is a break in the contact line.

In reference to the picking of a contact point midway between peaks, it is not the intention of the writer to go into instrumental problems other than to the extent to which they directly apply to the subject being discussed. It will be noted in many cases that where the sand-shale contact line extends over a vertical distance in excess of four feet, the line will not be a straight unbroken line, but will have a central unbroken portion covering a four-foot vertical distance, in the middle of which will be the radioactive contact. (See contact at 8440 feet, Figure 5.) This is the result of the length of the detector used, which consists of a gas ionization chamber four feet long. In this chamber are long electrodes which act as a single pick-up electrode four feet long, therefore a contact between shale and sandstone will begin to be reflected on the log when the top of the detector reaches the contact and effect of contact will not cease to be indicated until the entire chamber has passed the contact. In addition, there may be a time lag between the change from a high gamma-ray charge to a low charge, or vice versa, due to the manner in which current is amplified to the recording device. It is the writer's understanding that improvements in design of equipment are being made to reduce time lag and effective length of the electrode. Such efforts will tend to reduce the vertical distance through which a contact line passes, but the contact plane will still lie midway between the points where the ionization chamber enters and leaves the contact or midway between the peaks where the contact is a straight line. Both of these are illustrated in Figure 5.



(Wm. Helis' 1-B LSU, University Field.)

FIGURE 5

Correct Basis for Selecting Contacts on Gamma-ray Logs. Order of reliability: 1. shale peaks, 2. sand peaks, 3. sandstone tops, 4. shale tops.

It may be found helpful in selecting correct correlative points where there is doubt as to which may be correct and which may be divergent on unreliable points to check by using the principle of isopaching. (See Figure 4.) This merely requires the measurement of the interval between two apparent correlative points on both logs and, if the thickness is identical, both contact points will probably be correlative, although it is possible that they may check in thickness and yet both be wrong. This could be the case where shale tops were being used, but if shale or sandstone peaks were being checked and the intervals were identical on both logs, then it would probably be correct to use these points for measurement correction. If the intervals in any case did not coincide, then one must be wrong and use of multiple readings would be required to determine which was the correct point to use.

It should be stated that it is theoretically possible that the majority of the "best" picks may be wrong in that they might all happen to represent contact planes or peaks in which radioactive properties and electrical properties fail to coincide. While this possibility is admitted it is felt that such a case would be too rare to be serious. It might occur where circumstances prevented surveying more than a short section of the hole and if an incorrect factor were determined because of conditions here postulated, then trial and error would be the probable method of completing the well.

It has been found most satisfactory for long section correlation to use electrical and gamma-ray logs on a scale of 1 inch = 50 feet and for more accurate results to use a 1:50 engineer's scale to measure points within the nearest half-foot.

TABLE 1

Correlation Number	Electrical Log Depth	Type of Pick	TYPES OF POINTS 1 Shale Peaks		2 Sand Peaks		3 Sand Tops		4 Shale Tops	
1	3726½	4	....	....	....	....	....	....	3717½	+9[E]
2	3592	3	....	....	....	....	3586	+ 6	....	....
3	3585½	2	....	....	3578½	+7	....	....	....	....
4	3576	4	....	....	....	....	....	....	3568½	+7½
5	3555	3	....	....	....	....	3547	+ 8	....	....
6	3549	1	3542	+7	....	....	....	....	....	....
7	3547½	4	....	....	....	....	....	....	3539½	+8
8	3459	3	....	....	....	....	3452½	+ 6½	....	....
9	3420½	1	3414½	+6	....	....	....	....	....	....
10	3408	1	3403	+5[E]	....	....	....	....	....	....
11	3405½	2	....	....	3398½	+7	....	....	....	....
12	3392	3	....	....	....	....	3387½	+ 4½[E]	....	....
13	3383½	4	....	....	....	....	....	....	3377	+6½
14	3306	4	....	....	....	....	....	....	3299½	+6½
15	3274½	3	....	....	....	....	3268½	+ 6	....	....
16	3248	1	3241	+7	....	....	....	....	....	....
17	3247	4	....	....	....	....	....	....	3238½	+8½[E]
18	3241½	2	....	....	3234	+7½	....	....	....	....
19	3228	3	....	....	....	....	3221	+ 7	....	....
20	3196	2	....	....	3189	+7	....	....	....	....
21	3193	3	....	....	....	....	3185½	+7½	....	....
22	3174½	2	....	....	3166	+8½[E]	....	....	....	....
23	3171	3	....	....	....	....	3164	+ 7	....	....
24	3150	3	....	....	....	....	3147½	+11½[E]	....	....
25	3148	2	....	....	3140	+8	....	....	....	....
26	3126½	4	....	....	....	....	....	....	3119½	+7
27	3125	2	....	....	3116	+9[E]	....	....	....	....
28	3120	3	....	....	....	....	3112½	+ 7½	....	....
29	3098	3	....	....	....	....	3090	+ 8	....	....
30	3079	2	....	....	3071	+8	....	....	....	....
31	3075½	3	....	....	....	....	3068½	+ 7	....	....
32	3045	4	....	....	....	....	....	....	3035½	+9½[E]

Capitulation of Discrepancies

No.	Discrepancy	
1	+ 4½	Eliminate.
1	+ 5	Eliminate.
3	+ 6	24 out of 32 give a correction factor of +7.
3	+ 6½	
9	+ 7	
4	+ 7½	
5	+ 8	
2	+ 8½	Eliminate.
2	+ 9	Eliminate.
1	+ 9½	Eliminate.
1	+11½	Eliminate.
32		

Legend

+ = Gamma ray higher than electrical log.
— = Gamma-ray lower than electrical log.
[E] = Eliminated discrepancy factor.

Determination of Correction Factor

Four types of points on gamma-ray logs have been discussed for correlation with electrical logs. Conditions where the use of any or all these might

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Above—View from third girt, illustrating Sand Reel and Walkaround Platform, 1 V-12, 420 H.P. Climax Engines, Compounding Transmission, Gardner-Denver 8x20 and 7½x12 Slush Pumps with V-Belt Drive and Guards.

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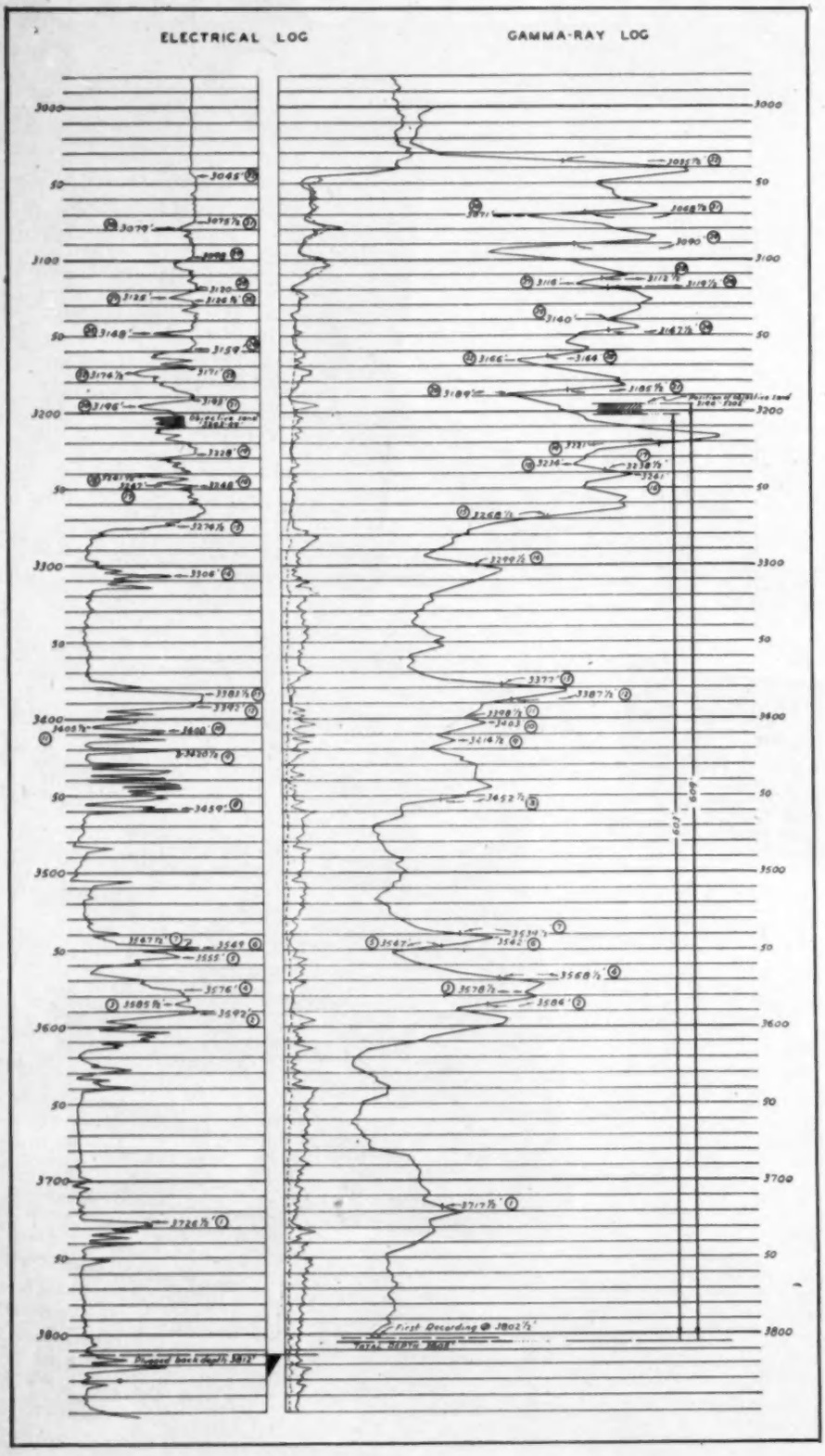

(Wm. Helis' 1-C Duplantier, University Field.)

FIGURE 6

Multiple Series of Readings on All Correlative Points Necessary to Establish Correction Factor for Measurement Discrepancy between Gamma-ray Log and Electrical Log. (Table 1, previous page, is a tabulation of these readings, giving amount of discrepancy in each case. The capitulation of discrepancies shows the predominance of 7 feet.)

introduce errors if used by themselves have been illustrated, the errors being least when using shale peaks and increasingly likely to occur with use of sandstone peaks, sandstone tops, and shale tops in the order listed. To establish a measurement correction factor, therefore, it is necessary to apply multiple readings of all of these as illustrated in Figure 6 and Table 1. In the well illustrated all *apparent* correlative points were picked, according to the above basis of selection and readings tabulated. The correction factor is selected by predominance of discrepancies and it has been found that these should be held to a limit of one foot from the selected factor. When the factor has been determined, any discrepancy which does not conform to it within this limit is eliminated. These eliminated points may very well be correct correlative points, but for measurement purposes cannot be used because they probably reflect some one of the conditions cited above where electrical and gamma-ray logging characteristics do not coincide. An example of the necessity for making multiple readings is shown at the contact at 3159 feet on the electrical log, the obvious correlative point on the gamma-ray log being 3147½ feet, a difference of 11½ feet. At 3148 feet, however, on the electrical log the discrepancy in measurement is 8 feet, and the correction factor could not be 8 feet at 3140 feet and 11½ feet at 3147½ feet (gamma-ray depths). Therefore, the latter contact is eliminated after tabulating all readings on the grounds that this contact does not react the same to both methods of logging, even though there could be no mistake on identification of sand in each log.

Correction Factor

If in Figure 6 the shaded sand on the electrical log at 3203-09 feet is to be tested, a comparison of the two logs shows that a correction factor on this sand could not be determined, but the tabulation of picks shows the predominant discrepancy is +7 feet. Then, if the well bottom is logged at 3805 feet by the gamma-ray log, the well bottom on the electrical log would be at 3812 feet. This new well datum is applicable, however, only to the gamma-ray log, particularly if there are more than one correction factor applying to different parts of the log (see Figure 7 and text). The well datum point, or zero, is used on the gamma-ray log because it is the only log made in reference to this zero. If there is a difference between the correction factor near the bottom of the hole and that near the objective sand, there is a difference in the number of feet of measured thickness of the rocks penetrated between zero and that sand as measured by the two logs. Therefore, the measurements from zero to that sand must be taken from the gamma-ray log. In the case cited, the object sand is located on the gamma-ray log at 3196-3203 feet and the zero datum is 3805 feet, therefore, that sand is now described as being 603-609 feet above zero, regardless of the depth assigned to it by either method of logging.

Another reason for using only the well datum from the gamma-ray log is that conditions under which measure-

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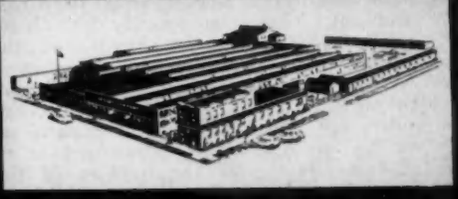

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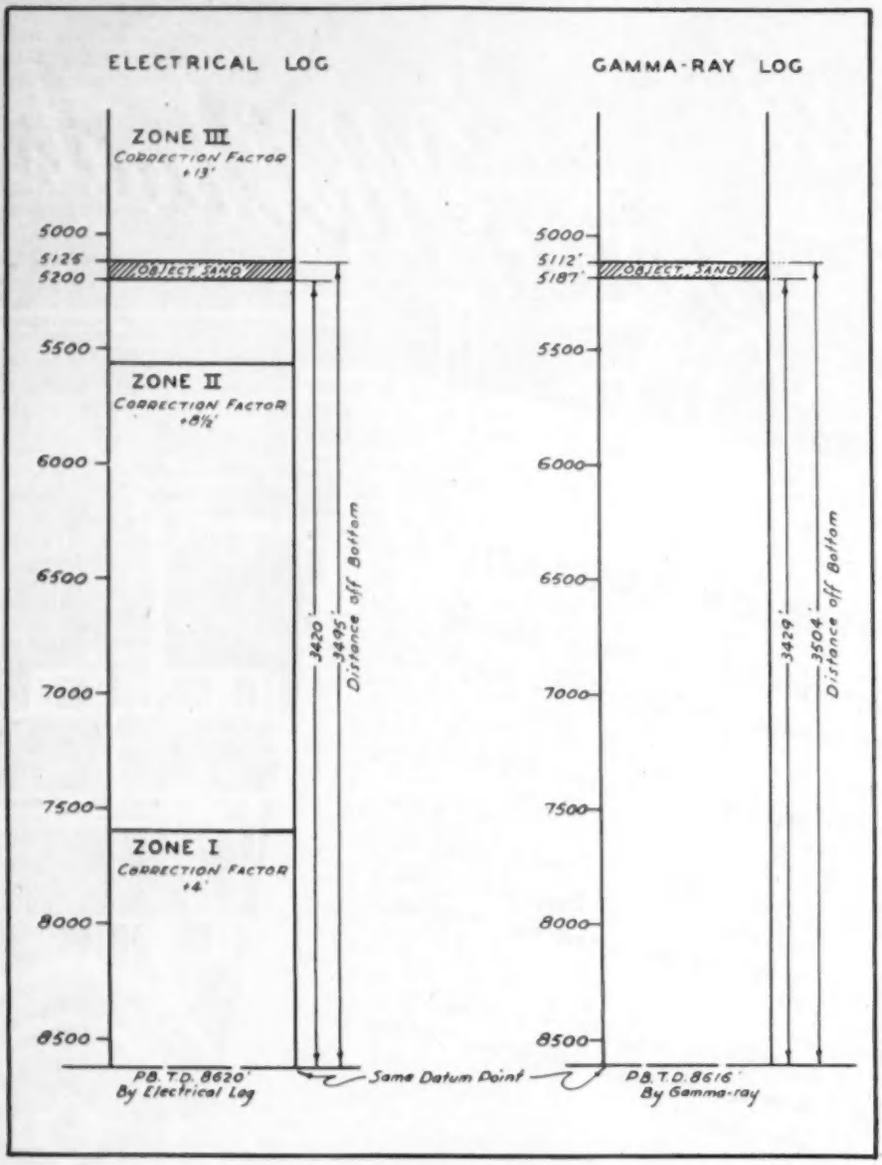


FIGURE 7

Diagrammatic Sketch Showing Effect of Different Correction Factor Zones in Determining Position of Object Sand Above New Well Bottom. Difference in distance off bottom between the two logs is 9 feet.

ments are made for perforating a well more closely resemble those conditions under which the gamma-ray log were made than those prevailing when the electrical survey was made. The character of the cased hole will not have changed between the time the gamma-ray log is run and the time the perforating gun is run into the hole and the condition of the mud will have time to change only to a negligible amount, if any.

Figure 7 is a diagrammatic sketch of a well where three zones occur each with a different discrepancy in measurement. The position of the object sand on both logs is shown and the difference in the distance above well zero on the two logs also is indicated. In such a case the only safe way of indicating the position of the sand as far as perforating is concerned is to give its depth off the bottom of the gamma-ray log.

Summarizing this method of determining the completion depths where measurement discrepancies occur, the following steps are taken:

1. Tabulate all apparent correlative points between electrical and gamma-ray logs; selecting first, all peaks of thin shale breaks in sandstone beds; second, all sandstone peaks positively identified on both logs, checked by isopaching where necessary; third, sandstone tops where peaks are insufficient in number to serve the purpose; and fourth, shale tops where necessary to provide a satisfactory series of readings.

2. Select a correction factor for each zone or for the entire log by the predominance of the prevailing discrepancies, eliminating all those which vary more than 1 foot from the selected factor.

3. Where more than one zone is found, determine where the change in correction factors occurs.

4. Identify the position of the object sands on the gamma-ray log by applying the correction factor when the position cannot be established directly by correlation.

5. Calculate distance above the datum zero on the gamma-ray log to completion depths in the object sands by simple subtraction and give completion perforation points in terms of feet above this established zero point.

Subsequent Workover Discrepancies

It should be noted that this procedure will apply only for the first completion after setting a new well bottom. If squeeze perforations are required and a new bottom exists, only precise pipe measurements can locate the new datum point in reference to that established by the gamma-log. If further discrepancies appear between pipe and perforating gun measurements, only two recourses are left where critical depths are involved. One choice would be to resurvey by gamma-ray and repeat the above procedure. The other is to keep an accurate record of the joints of casing set in the well and to locate a collar in the casing near the new bottom. This use of a collar checker may show where the discrepancy exists and completion of the well may proceed without relogging.

BIBLIOGRAPHY

Pointecorvo, Bruno: "Neutron Well Logging," *Oil and Gas Journal*, Sept. 11, 1941, pp. 32-33.

Russell and Downing: "Neutron Logs Find Porous Zones in Western Kansas Limestones," *Oil and Gas Journal*, Aug 6, 1942.

Weaver, Paul: "A Theory of the Distribution of Radioactivity in Marine Sedimentary Rocks," *Geophysics*, Vol. VII, No. 2, April, 1942, pp. 192-198.

Howell, Lynn G., and Frosch, Alex: "Gamma-Ray Well-Logging," *Geophysics*, Vol. IV, No. 2, March, 1939, pp. 106-114.

Green and Feron: "Well Logging by Radioactivity," *Geophysics*, Vol. V, No. 3, 1940.

Westby and Scherbatskoy: "Well Logging by Radioactivity," *Oil and Gas Journal*, Feb. 22, 1940.

Russell, W. L.: "Well Logging by Radioactivity, THE OIL WEEKLY, Nov. 11, 1940.

Russell, W. L.: "Well Logging by Radioactivity," *Bulletin, A.A.P.G.*, Vol. 25, Sept., 1941, p. 1786; also Dec., 1941, p. 2211.

Beers, Lowell C.: "Radioactivity Logging Through Casing," *Petroleum World*, Nov., 1941.

Campbell, John L. P.: "Gamma Ray Logging in East Texas," *The Petroleum Engineer*, Jan., 1944, pp. 156, 158.

Evans, R. D., Kip, A. F., and Moberg, E. G.: "The Radium and Radon Contents of Pacific Ocean Water, Life and Sediments," *Amer. Journal Science*, 5th series, 214, Vol. 36, Oct., 1938, pp. 241-259.

"Radioactivity Logging Proves Help in Reworking Old Wells," *Oil and Gas Journal*, June 25, 1942, p. 140.

Short, E. H., Jr.: "Use of Gamma-Ray Curves Increases Possibility of Successful Workover," *Oil and Gas Journal*, Vol. 42, No. 45, Mar. 16, 1944, pp. 85-87.

Lane-Wells Company (in, *Tomorrow's Tools Today*):

Beers, Lowell C.: Radioactivity Logging Reclaims Depleted Wells in Long Beach Field, California," Vol. VIII, No. 1.

Cantrell, Ralph: "Radioactivity Logs Aid in Making Coast Workovers Worth While," Vol. VIII, No. 2.

Winter, A. B., Bowsky, M. C., and Stick, J. C., Jr.: "Correlation Between Electric Logs and Radioactivity Logs," Vol. VIII, No. 3.

Campbell, John L. P.: "Locating Cased-off Production in Old Wells," Vol. VIII, No. 3.

Winter, A. B.: "Use of Neutron Curves," Vol. VIII, No. 4.

Neale, John J.: "Proper Completion Assured by Radioactivity Logs," Vol. IX, No. 1.

Barcklow, J. C.: "Adaptability of Radioactivity Logs to Limestone Zones in Old and New Wells," Vol. IX, No. 2.

Adler, Robert Lee: "Recompletions Based on Radioactivity Logs," Vol. IX, No. 3.

Hughes, James D.: "Radioactivity Logging Provides Valuable Data for Gulf Coast Operations," Vol. IX, No. 4.

Trapped Oil Recovered

Off-Balance Repressuring

By F. R. COZZENS
Equity Oil & Gas Company

REGARDLESS of the manner in which a secondary oil recovery measure has been carried out, the most critical period occurs when the wells reach their maximum output and production starts to decline. The sole objective from the beginning has been to get as much oil as possible from an area of sand already depleted by natural pumping, and as a means to that end, a driving force (air or gas) was applied so as to build up a fairly uniform pressure in various productive zones of the sand body. The rise in production which generally follows this procedure confirms its soundness up to a certain point, and finally, when the leveling-off stage is reached it seems quite logical to believe that a continued application of the same remedy which boosted production will carry the project on to a successful finish.

It also seems logical to surmise that the leveling-off stage indicates that all the oil capable of being affected by the driving force is already corralled in the sand, and that this reservoir can be drained more completely and in less time by increasing pressures all along the line. If we were dealing with a sponge which could be squeezed dry by equal pressure from all sides this theory would be correct. Unfortunately, an oil sand is a far more complicated structure and only a portion of its fluid content can be forced to a central point. The same driving power that forced oil so readily to producing wells likewise expended its energy in other directions, forcing oil beyond the range of producers, where it was caught and held between pressures and counter-pressures from other inputs. Oil was also caught and held against side-margins of the sand, and pushed into blind pockets and spurs.

'Oil Traps'

Such accumulations of oil, commonly termed 'oil-traps' vary greatly in number and scope, and as to their position in the sand.

Each oil trap or reservoir can be roughly compared to a lake, held in bounds by the driving force (pressures) within the sand. To recover any worthwhile portion of the contents, the lake must be drained into areas of sand within range of producing wells. The logical way to drain the lake is to weaken some section of its boundary, and the most effective method of speeding this action is to apply additional pressure against other sides of the boundary while the one point is being weakened.

This, in effect, is the principle of "off-balance" pressuring. The principle is carried out first, by cutting (temporarily) the driving force on certain induction wells in a given pattern, while force upon wells in adjoining patterns is materially increased; second, by eventually making each emptied oil-trap a pressure area which becomes a factor in squeezing out other traps in various parts of the project. The result is a 10 to 20 percent increase in recoverable oil; less labor and materials are required to produce it, and in many cases, recovery time has been reduced one third to one half.

Start of Program

Off-balance pressuring is put into effect when the first wells in a recovery pattern show signs of an oil decline. This is learned by daily gauging of individual wells. Granting that a continuous pressure has become reasonably stabliized in the sand over a period of time, the initial step is to reduce induction force on the input nearest the weakening wells, as much as one half. The input may be throttled to cut the force, or excess pressure may be "blown off" at the casing head. Estimating (approximately) this cut in pressure in pounds, a like amount is promptly added to all inputs adjoining the weakened pattern. Thus, if 500 pounds of pressure have been reelased from the first input, an additional 500 pounds are added to each neighboring input. The objective is to unbalance temporarily the former pressuring schedule in that immediate area, while driving force is directed toward the weakened pattern.

As a general rule, the first wells to show an oil decline are located in loose, open sand which is also the first zone of a project to become channeled through by-passing of driving force. Usually, within a period of 30 days or less, these channels from which pressure was taken fill with oil, proving that local traps and marginal oil has been forced in. The weak producers show a sharp production rise as they pick up this oil, and production continues until all localized traps are drained. The final slack-off is rather abrupt, and after it occurs, all producers of the pattern are dropped from the pump and shut in. Driving force is again turned in to the weakened input, with as much speed and volume as it will take.

Process Continues

By the time the first pattern has been completed (or perhaps before), certain producers in other parts of the project are showing a decline. Unbalancing is carried on to these wells by weakening their input, and increasing force on adjoining inputs exactly as was done in the first pattern. While the process continues, pressures are again building up in the first pattern, and soon reach a stage where they become a major factor in pushing oil to weak producers in neighboring patterns. The channeled, and hogged-out sand from which the first trapped oil was drawn now becomes a pressure-area, and void of oil as long as the dormant producers are kept closed. The operator need give it no further attention except to keep the input going at full capacity, and he has that much less territory to worry about. As each weak pattern is treated and drained out, it too becomes a pressure-area by the same procedure. The process continues until all patterns in the project are treated. All inputs are kept going at full capacity as long as a sufficient number of producers remain to yield a profitable flow of oil. The final wells to show a decline are generally located in tight or restricted sand. The stimulated driving force, plus the aid of the various pressure-areas which have been built up by this time, not only pushes oil from these restricted zones, but also flushes stretches of tight sand which have remained immune to regular pressuring.

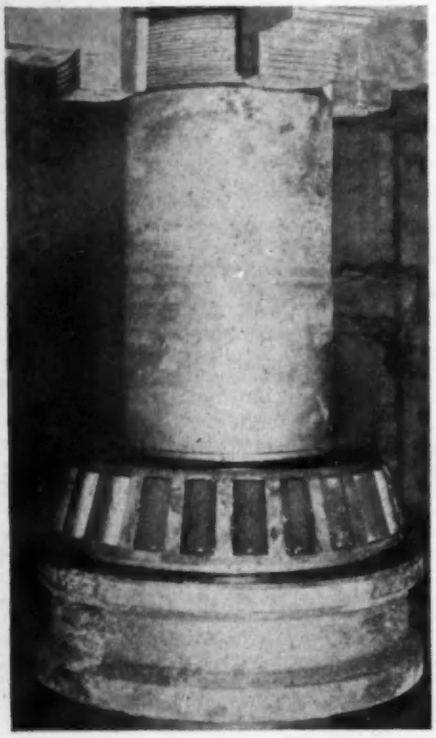
In sands of sufficient thickness to be zoned, the unbalanced pressuring is sometimes varied by cutting to one half the driving force in the upper zones of an input, while a similar amount of force is added to the low, or bottom zone. This is done on two or more inputs in the vicinity of weak producers, the objective being to lift marginal oil to upper zones where it can be pumped more readily. If salt water is predominant in the low zone (as it usually is), a pressure-area can sometimes be created with a zoned input by applying a high driving force into the water-logged section of sand, causing the water-level to rise sufficiently to flood out channeled and otherwise undesirable areas. A casing head pressure of around 1000 pounds is generally necessary for the job. The volume of water provides additional driving force especially effective in localities where oil-traps are caused by excessive by-passing of air or gas.

Because of narrowness, or other irregularities, many oil sands can neither be zoned nor patterned. The majority of these sands are of conglomerate structure, varying considerably in depth and thickness, but if either air or gas drive has been found successful, they are adaptable also to off-balance pressuring. It is almost impossible to establish a definite pressure-area in an unpatterned sand, so the usual procedure is to stop the driving force entirely on those inputs located in, or near the center of the scope. Inputs near, and all along the margins or edges of the sand are given all the driving force they will carry. When these inputs are found not capable of taking a pressure of 500 or more pounds, it is often advisable to turn edge-well producers into inputs. Since the majority of unpatterned sands average less than 300 feet in width, the edge inputs, highly-pressured, drain marginal pockets into pumping range of centrally-located producers. Speed of oil response in such sands is determined to a great extent by the distance between inputs and producers, and is usually somewhat slower than on sands where definite patterns have been worked out.

Benefit to Operator

Unbalanced pressuring is not to be confused with intermittent injection (slugging), and is never in any case meant to replace uniform, or continuous pressuring. The unbalancing process cannot function successfully until after a reasonable, stabilized pressure has existed in the sand for a period of time, and its sole purpose is to complete the recovery job. The volume of oil recovered depends, of course, upon the amount of trapped oil in the sand, but almost without exception, results justify the process. Finishing off is abrupt as well as effective, and eliminates the tedious, dwindling oil decline so commonly experienced when a project is terminated by regular uniform pressuring. Not only is the oil produced in less time, but more oil is recovered.

Doubling Swivel-Stem Service Through Metalizing Operation



Mounted in the lathe, the rust and corrosion on this 6-inch swivel stem may be seen to have cut into the normal packing surface to such an extent that further operation was impossible, due to loss of mud and excessive packing wear despite frequent repacking jobs.

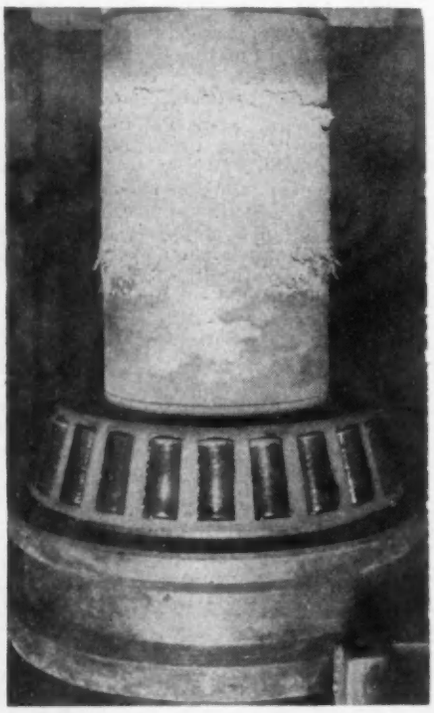
Application of filler metal through worn area found to rehabilitate swivel stem. Down time less than 8 hours and service life is doubled

By ELTON STERRETT, Staff Writer

WEAR and corrosion of the swivel stem through the packing zone combine to make this unit unserviceable long before the threaded ends usually show deterioration, resulting in premature junking. One operator has successfully applied filler metal through the worn area, quickly and cheaply rehabilitating the swivel stem so that its service life was doubled.

Conditions existing at the pack-off on the swivel stem are most severe, the shaft revolving in a fixed plane, with no lateral or longitudinal motion to permit the packing to wipe the shaft clear, as is the case on plungers, rods and other packed members operating with a reciprocating motion. The packing is restricted to a relatively narrow band on the stem, due to clearance limitations, and is subjected to periods of idleness during which the packing rings are not pressed against the shaft by pressure of the mud stream. The time in which the packing is not under hydraulic pressure, while not involving any cutting of the stem by grit embedded in the packing rings, affords opportunity for accelerated rust formation.

Rust, once formed, serves to accelerate deterioration of the stem at the critical zone, tending to hold moisture and to prevent close contact between packing and steel stem. The rust particles, when formed during down time, break free during operation to act as an abrasive, scoring the shaft further, and also cutting away the packing which permits free entry of mud-



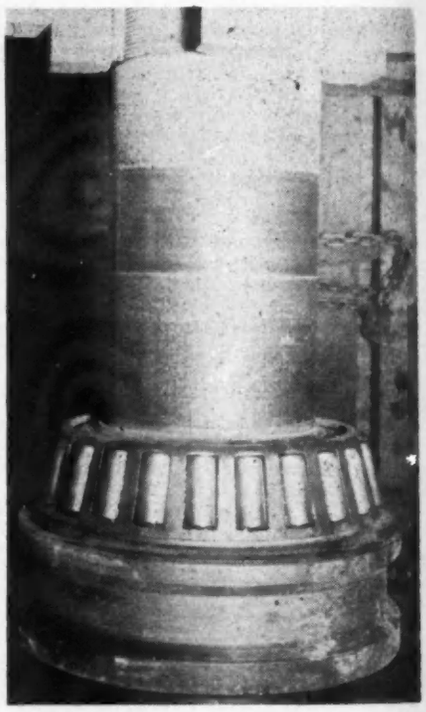
After the stem had been worked over until all the rust pits had been removed, and a specially rough thread had been cut into the parent metal to provide holding ground, a thin coating of special high-chrome alloy was sprayed on to fill the surface to former levels.

borne grit into the box to abrade further the stem.

When this combined rusting and wear reaches the point where it is no longer possible or practicable to pack off the joint and maintain desired mud circulation without serious leakage, the stem must be scrapped, although no wear other than at the packing surface may be apparent.

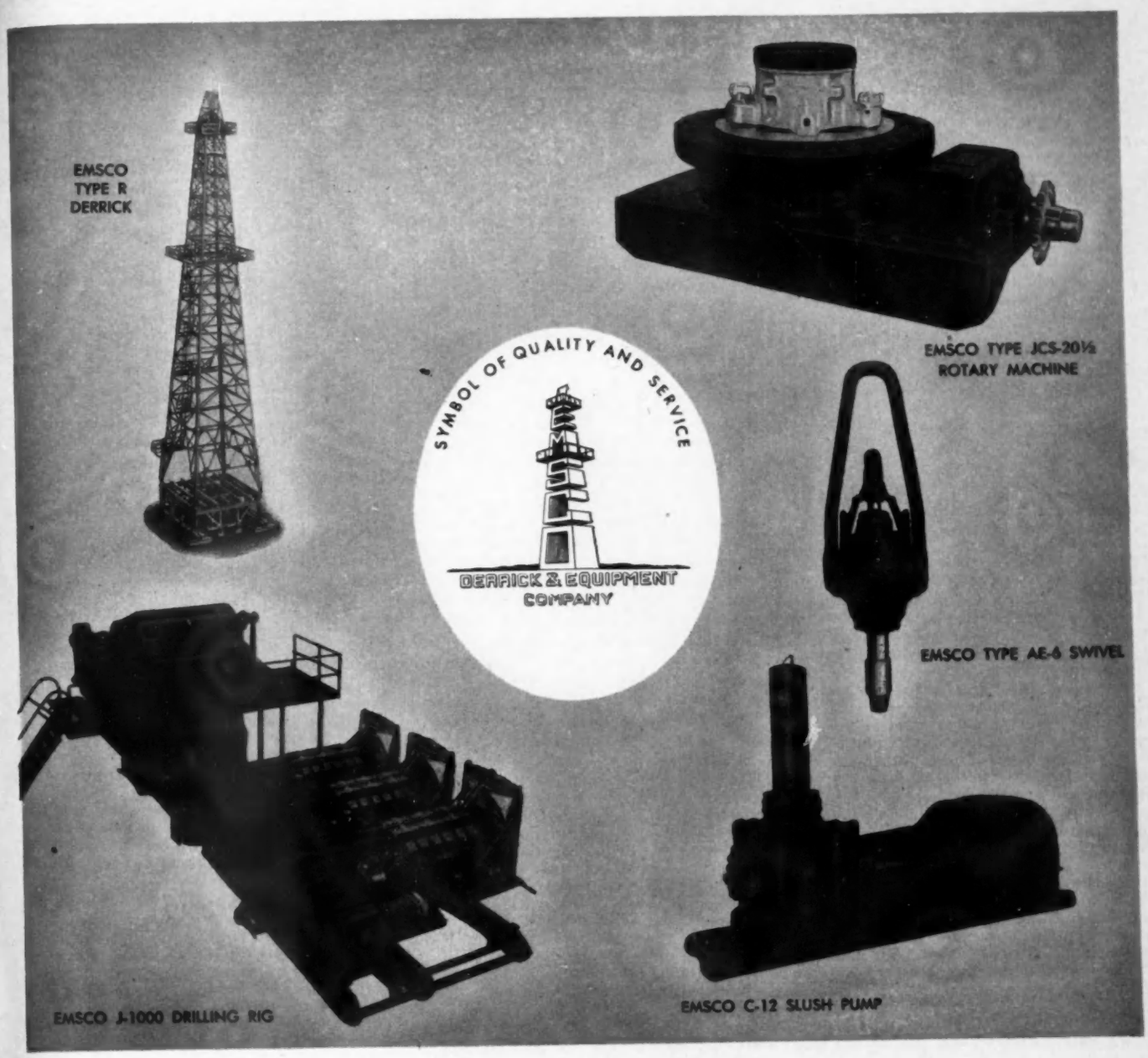
To recondition this important part of the swivel, one operator dismantled the swivel, had the stem centered carefully in a lathe—driving the shaft through wooden blocks forced tightly against the upper thread by jaws of the lathe faceplate—and had the abraded surface built up by metallizing with 12-Chrome wire.

The stem was first turned down with a roughing tool throughout the packing zone and for a short distance either way from the actual contact zone. This turning was carefully done to remove as little metal as necessary, yet to insure the removal of all rust and to insure a clean surface for the new material. The metal removed ran as high as 3/32-inch through the two grooves shown on either side of the relatively high center of the abraded area. Following the operation to clear away the rust and corrosion, the turned section was then gone over with a thread-cutting tool, set below center and with



The alloy coating, filling the entire annulus cut with the lathe and extending beyond upper and lower limits of packing zone, has been turned to slightly above design diameter, and then brought to size by grinding with tool-post grinder to afford desired finish.

Photographs courtesy General Metallizing Company of America.



For Quality Service Under the Toughest Conditions

Imagine the pull on the swivel when your drilling string is 5,000, 10,000, or even 15,000 feet down. Have you thought of the drag on the rotary table, the load on the draw works, the stress and strain on the whole drilling rig assembly when your driller hits a hard rock formation way down under. That's when you count on built-in ruggedness, the ability to stand up when the going gets tough. That's where the quality of both materials and service wins your everlasting thanks.

Emsco oil field drilling equipment is built on the basis of quality from the heaviest casting down to the smallest nut. This means top performance under the toughest drilling conditions. Emsco quality is your assurance of lasting satisfaction.

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negative rake to form a jagged thread, in this case 16 to the inch. The thread depth was varied to follow the irregular contour of the surface left after turning off the rust, so as to preserve as much of the parent metal of the stem as possible.

Following the threading operation, and as quickly thereafter as possible to prevent any contamination of the clean metal by dust, rust or oil, the entire area and some ¾-inch on either side of it was sprayed with 12-chrome metal, applied by a metallizing gun mounted in the lathe tool post and fed slowly across the zone by the lathe feed. The rate of wire feed, progress across the face of the cut, and rotating speed of the stem in the lathe were so regulated as to give a dense coating of the chrome alloy of a thickness sufficient to replace all the metal which had been removed, and to allow a margin of about 1/32-inch for rough turning and final grinding to size.

The sprayed metal, though molten by the flame as it issued from the nozzle of the gun, was instantly cooled by the relatively great mass of the stem, and at no time during the rebuilding operation was the stem heated to a temperature which could not be borne by the hand, and, therefore, no change was effected in the original heat-treat of the steel.

The success with which the spray of molten metal was localized is evidenced by the fact that the thrust-bearing assembly at the collar of the stem was not wrapped or covered, and was ready for reassembly in the swivel simply by being washed clear of old lubricant and dried thoroughly before applying a new coating of grease.

The packing-area surface left after applying the extremely hard chrome coating, turned to proper diameter by a tool-post grinder, is much harder than the original steel, and thus better able to resist the initial abrasion of mud-carried grit, and thus in better condition to continue to afford the smooth cylindrical surface for packing fit which is demanded by the extreme service at this point.

One Lathe Mounting

Reconditioning of the swivel by this method permits the entire job to be done with one mounting of the piece in the lathe. The grinding by a tool-post unit, although possibly not as accurate as one carried out in a special grinding machine, possesses the advantage of insuring concentricity of the rough turning and final finished surface, distributing the grinding uniformly around the circumference of the metal and avoiding the "skips" which otherwise might appear. Since the swivel rotates at relatively slow speeds within the packing box, any slight deviation from absolute concentricity of rotating axis and ground surface is readily compensated for by the resilience of the packing.

The repair required less than 2 pounds of the special 12-chrome alloy wire, put back into service for another equivalent of the initial service life some 485 pounds of special alloy steel on which many man hours had been expended for the initial fabrication. And the cost was about one tenth the cost of a new stem—were such a unit immediately available. From the time the swivel was disassembled until the unit was again ready to hang in the derrick was less than 8 hours.

Casing Selection Charts

■ CONTINUED FROM PAGE 36

using the factors decided upon, for each of the available classes of casing. The API joint-strength figures listed in each case are first divided by 1.8 (the tension safety factor already agreed upon) to change feet of casing string length without safety factor to the proper figure for use in the chart. Resulting figures are now plotted on C-D, thus:

5510 ft. for 14-lb. H-40 casing (short threads)
7370 ft. for 14-lb. J-55 casing (short threads)
8850 ft. for 15.5-lb. J-55 casing (long threads)
10,450 ft. for 17-lb. N-80 casing (long threads)

The 17-pound N-80 casing depth falls beyond the agreed limit of the chart, but is included to demonstrate that it is suitable for at least that depth. No points are included for several intermediate casing classes, namely 15.5-pound J-55 with short threads, 17-pound J-55 with both threads and 17-pound N-80 with short threads, because their critical setting depths nearly coincide in each case with one of the classes selected. Here again company policy must govern the particular decision.

As with the collapse curves in Figure 1, a simple tension chart can be prepared by drawing lines from each setting depth parallel to the critical collapse depth line (dotted lines, Figure 2), and casing strings can now be read directly from the chart. The vertical distance between each dotted line and the critical collapse line is now equivalent to the setting depth tension. However, these lines are correct only when the unit weight of the casing is the same through each string, and since the collapse calculations in Figure 1 (shown in light, solid lines in Figure 2), resulted in weight variations, it will therefore be necessary to recalculate each line. From 5510 feet up to 5640 feet, the point at which the 15.5-pound casing begins, no correction need be made in the slope of the 14-pound H-40 line. From 5640 feet to 6860 feet the slope will gradually increase as a greater proportion of 15.5-pound casing will be present and from 6860 feet to 10,000 feet the slope will increase at an even faster rate due to the greater proportion of 17-pound casing. These corrected slopes are determined approximately by calculating the equivalent of excess weight of heavier casing at several points and lowering the line at these points by this amount. For the 14-pound H-40 casing, the calculated reductions are:

At 6000 feet, the 400 feet of 15.5-pound equals 440 feet, approximately, of 14-pound casing, or an excess of 40 feet, which is the amount by which the line is lowered, as shown in Figure 2.

At 6860 feet, the excess is 140 feet.
At 8000 feet, it is 420 feet.
At 9000 feet, it is 670 feet.

When these lowered figures are plotted a corrected or limiting curve for tension is obtained.

Similarly, points are calculated for the other classes of casings, as follows:

	14-Lb. J-55	15.5-Lb. J-55
At 7370 ft.	270	X
At 8000 ft.	420	X
At 8850 ft.	630	No reduction
At 10,000 ft.	950	240

Plotting these figures in Figure 2 and drawing the heavy solid lines shown, completes the tension calculations.

Figure 3 shows the combined collapse curves from Figure 1 and tension curves from Figure 2, and if no additional considerations are decided upon, it may become a finished chart for field and design use.

Additional Considerations

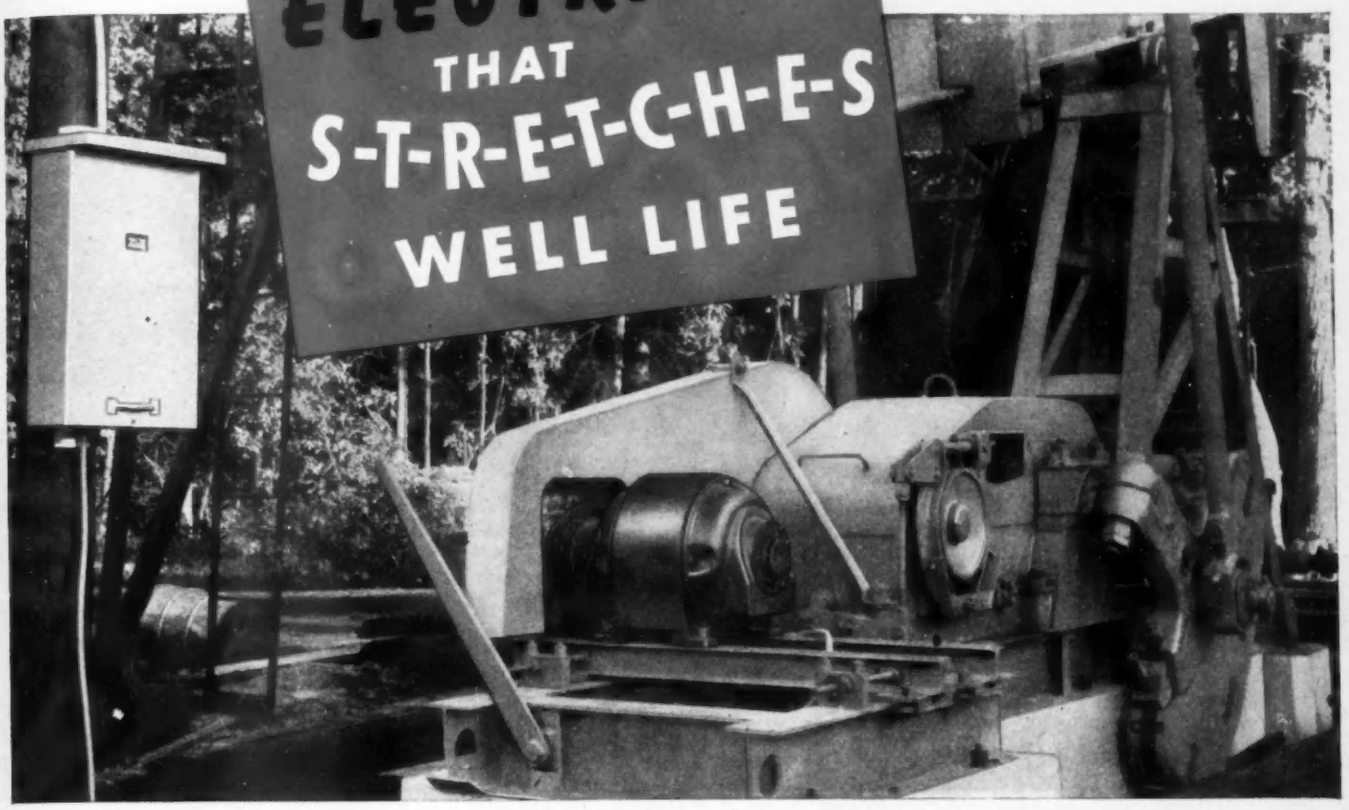
Other matters of company policy may now be incorporated into the chart. For example, it may be decided that no less than 1000 feet of the stronger weight and grade shall be run in any section at the top where needed to maintain the tension-safety factor. In this case, the top portion of each of the diagonal critical-tension curves will assume the shape indicated by the dashed lines. It might be decided to be impractical to run short sections of low-strength in the middle of strings. If for example, the minimum length of the intermediate string of low-strength casing were set at 2000 feet, the two vertical dot-and-dash lines shown in Figure 3 would replace the solid converging lines to their right in the chart. It is conceivable that some designing engineers might decide, due to risk of confusing field personnel with too many sections in a single casing string, to run no intermediate sections of lower strength than required at the top of the string. In this case the dot-and-dash vertical lines would be moved to the left until they coincide with the vertical portion of the dashed lines. Another company policy decision which might be incorporated would be a decision to run not less than some minimum length of the stronger weight and grade required at the bottom where needed to maintain the collapse safety factor. Such a policy could be incorporated in Figure 3 in a manner similar to that by which the 1000-foot minimum length of section at the top was handled.

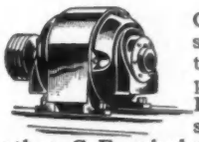
Another matter which might be given consideration is internal pressure — which at the top of a casing string is not offset by external pressure of drilling fluid. If it so decided, calculations of internal-pressure resistance of casing and of expected internal-pressure resistance of fluid can be made and the chart can be adjusted when found necessary in a manner similar to the dashed-line adjustment for minimum section length at the top of Figure 3.

Conclusion

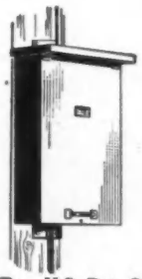
The versatility of casing selection charts is one of the main points favoring their use. Any important matter of company policy can be incorporated in the charts, making a clear, concise, and understandable record for permanent use by designing and specifying engineers, purchasing departments, and field-material and operating personnel. Although a chart for only one casing size has been developed here, the identical procedure is applicable to charts for each size used by an oil company. The charts, in blue-print or white-print form, can be given wide distribution among company personnel with the result that the confusion and ambiguity of long and tedious written recommendations (or, in many cases, no recommendations at all) can be eliminated. And the question so often asked in the field when a mixed string of casing arrives, "how do they want it run?" can now be answered, promptly and accurately, by reference to the company casing selection charts.

ELECTRIC PUMPING THAT S-T-R-E-T-C-H-E-S WELL LIFE





G-E splashproof, squirrel-cage induction motor driving pump unit in Illinois. Frames and end shields of this and other G-E splashproof motors are of cast iron, to resist rust and corrosion. Coils are wound of tough Formex* wire, to forestall electrical failure.



CR7008 G-E combination starter for oil-well pumping. Time switch (accessible when outer door is open) controls periodic pumping. Inner door prevents access to "hot" parts. Magnetic starter has self-cleaning, self-aligning contacts; is long-lived, easy to maintain.

*Reg. U.S Pat. Off.

WITH this new G-E motor-and-control team, you can coax along wells which do best when pumped slowly for long periods. You can step up the pace of those that can take it. In fact, you can tailor the pumping of any individual well to insure maximum life *and yield*.

You simply preset the proper pumping cycle on the G-E starter. Its built-in timing mechanism does the rest, automatically starting and stopping the pump. By eliminating the need for frequent supervision, this self-timing electric system affords substantial savings in man-hours.

From the standpoint of pumping life, G-E splashproof motors also offer this definite advantage: they possess electrical characteristics which act to cushion the shock and strain of reciprocating motion. Moreover, mechanically, these motors are well protected from wear, weather, and electrical breakdown.

G-E application engineers are ready to help you in selecting motors and control to fit your specific conditions. Call on them through the local G-E office. *General Electric Co., Schenectady 5, New York.*

Where purchased power is not economically available, isolated engine-driven G-E generators and a simple G-E power-distribution system will provide low-cost power for pump motors.

MOTORS AND CONTROL
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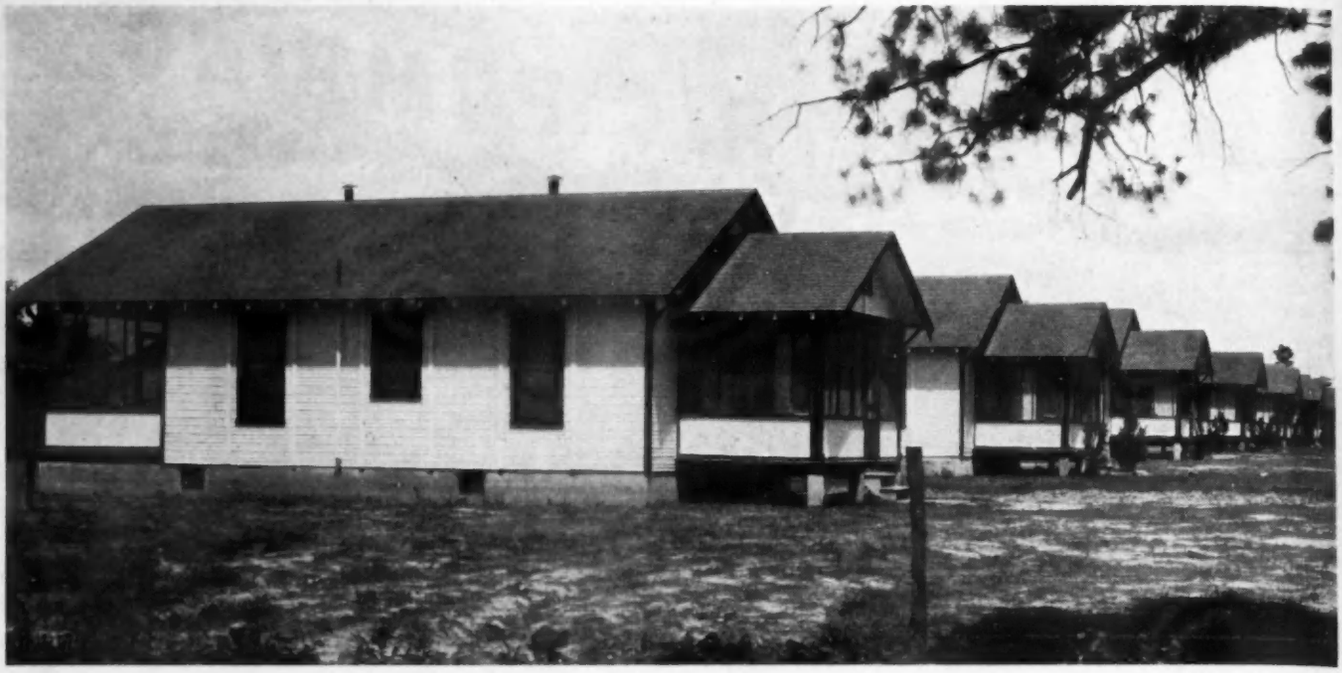


View of seven 5-room homes which house crews on an East Texas lease. The units were built more than 10 years ago and when the time comes can be demounted and moved to another lease with little loss.

Solving the Oil Field Housing Problem

By ANTHONY GIBBON, Staff Writer

LIKE MOST industries in wartime, the oil industry has had to fight a current housing shortage in certain sections of the country with the result that pre-fabricated, demountable houses which can be moved anywhere and set up in a matter of days, are more and more in demand. Several thousand pre-fabricated units of the conventional five-room type, are now being used by workers and their families who otherwise might have been forced to live in shanties, tents or trailers.

Confronted by serious material and labor shortages, oil operators are attracting skilled labor which might otherwise go to shipyards or airplane plants, by offering good accommodations through ownership of pre-fabricated houses, or by arranging to provide such houses. Despite large orders from government agencies, manufacturers of pre-fabricated houses are still meeting demands of the oil industry and pre-fabricated, demountable houses are going up in new oil fields or in camps which are being constructed to develop established pools.

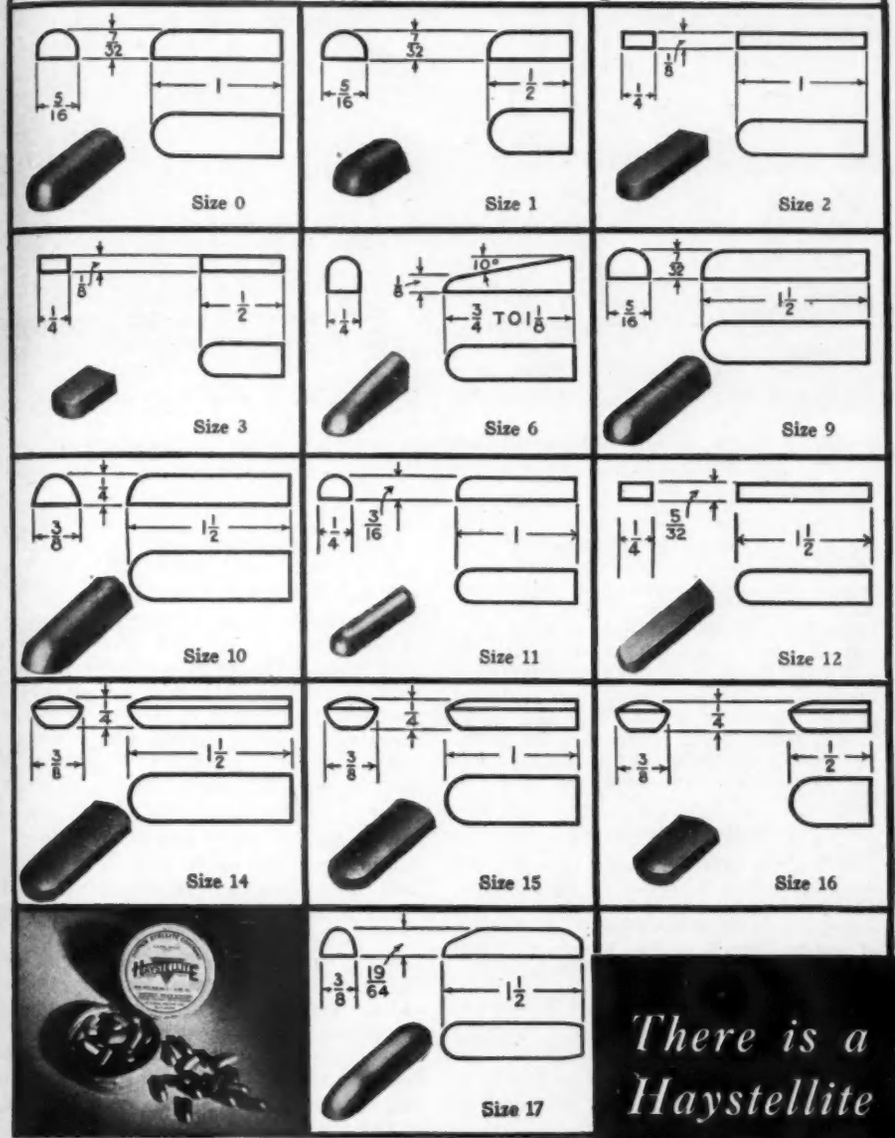
Following World War I, the American oil industry mushroomed into phenomenal growth. Becoming, as it were, of age, the industry, which attracted many new prospectors, branched out in an ever-expanding campaign of wildcat drilling. The pine forests of Louisiana, Texas and Arkansas; the hills and valleys of the west, saw an influx of drillers, roughnecks, roustabouts, clerks, engineers, etc., and the need for houses become acute. Old-timers looking around at today's neat, comfortable houses in oil field camps or on wildcat drilling sites, recall the ramshackle, tumble down lean-to's which sheltered the worker. Oil operators who have been in the business for a decade or longer remember the boom towns which sprang up overnight, jerrybuilt, flimsy, with houses veritable fire traps. Oil field workers, attracted by good wages, were repelled by poor living conditions, and seldom, during the early days of a new discovery, could you find the workers' families living on location. As a result, the oil industry suffered from a heavy labor turn-over.

Contrary to some conceptions, pre-fabricated houses are not just unfinished, box-like structures. Scattered throughout the nation's oil producing leases are scores of fine, pre-fabricated houses which the average individual would never suspect had been hauled hundreds of miles and installed in a matter of 10 days or so. They are, in fact, "homes" and contented families live and work there.

Pre-fabricated houses have been in use in the oil and other industries for many years. But, with the rapid expansion of oil prospecting, it became necessary to manufacture not only a "pre-fabricated" but also a "demountable" house, so that it might be moved with the shifting of activity. Leading manufacturers tackled the problem and designed the demountable, or sectional house which can be erected, torn down, reerected with small economical loss and without detracting from its appearance. On one Oklahoma lease there is a pre-fabricated, demountable house which has been put up and taken down and moved more than 20 times. Yet,

Haystellite Inserts
reduce drilling costs

Standard Sizes and Shapes



Haystellite cast tungsten carbide inserts are supplied in standard sizes. These inserts — almost as hard as the diamond — provide maximum abrasion resistance; and when properly supported, are tough enough to withstand the severe impact encountered in drilling. Good tools — properly set with Haystellite inserts and hard-faced with Haystellite tube rod—drill maximum footage of out-to-gauge hole.

There is a Size and Style of Haystellite Insert for Every Type of Drilling Bit

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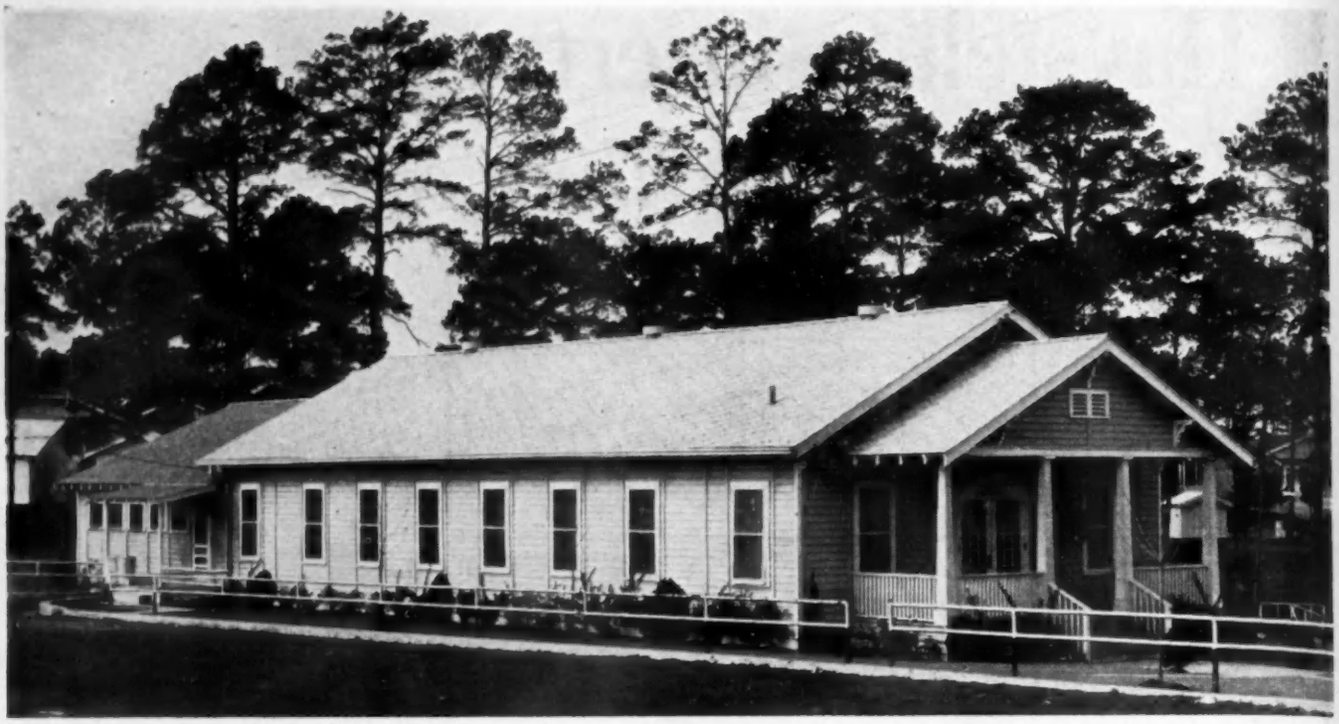


As a bunk house or recreation room this pre-fabricated, demountable unit with kitchen facilities attached, presents a good appearance on any lease.

surrounded by newer units, the observer would find it difficult to designate it from the newer, less-traveled units.

Economically, housing presents a serious problem to oil operators who can ill afford to scrap entire camps when moving from location to location. Before the advent of the pre-fabricated, demountable unit, when oil fields declined to the point where virtual abandonment became necessary, oil operators faced heavy losses in instances where they had spent considerable money for permanent housing facilities.

Manufacturers of pre-fabricated, demountable houses say that experience has proven that a house which can be economically demounted must be one which is made up of sections that can be taken apart, with the smallest number of pieces and consequently with the least amount of labor. A conventionally-built house, to be taken down, involves the necessity of taking apart everything that is in it. On the other hand, the demountable house is taken down room by room. By the same token, room after room can be added by merely removing the one wall, adding the new section and replacing the wall.

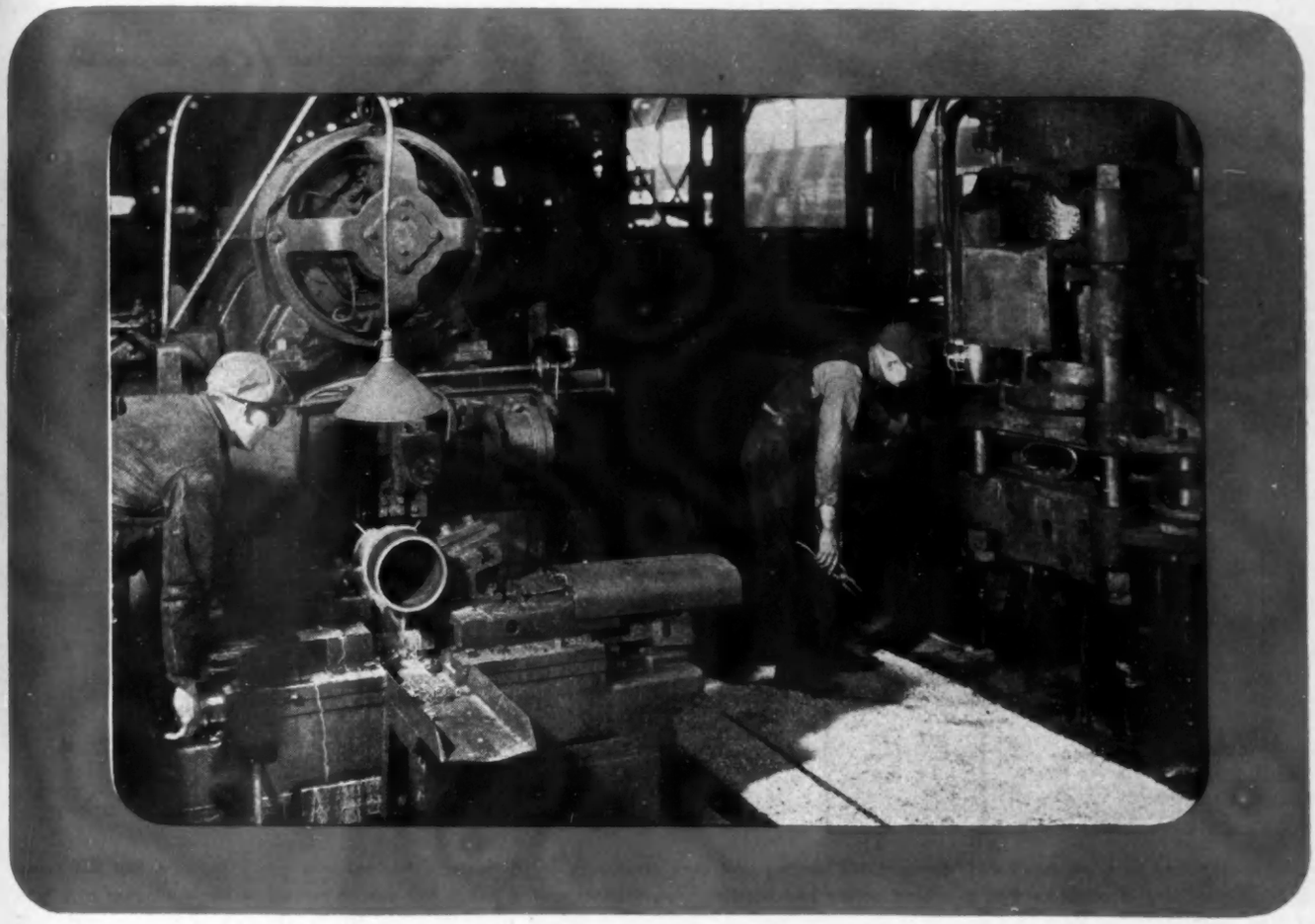
Filling the Order

When the manufacturer gets his order for one or more pre-fabricated, demountable units, he goes into his warehouse and there checks off his list of parts, much as a housewife will check off a grocery list as she scans the shelves and helps herself. The average five-room unit, which, is the most popular in oil fields and camps, is easily hauled to location on two transport trucks. Once on location, experienced crews erect the unit in about 10 days. Oil operators declare that the morale stimulated among employees by enabling them quickly to install their families in attractive homes is of great value.

Because of the opportunity for reproducing units on a large scale, pre-fabricated house manufacturers can employ good architects and engineers to design and plan single units or entire camps, something which might be economically impossible for the builder of a single, conventional-type house. Good architectural planning and engineering allows the pre-fabricator to take advantage of all new materials and ideas. It means that the purchaser receives the advantages of latest developments in house construction consistent with price paid for the unit. Because manufacturers know that pre-fabricated, demountable houses are to be erected possibly at remote points and perhaps by unskilled labor, units must be made of the finest lumber and precision workmanship. Only straight, kiln dried lumber is suitable as unseasoned lumber warps, twists and shrinks between the factory and building site and would give trouble in assembling. Good lumber, combined with factory precision in cutting, is one of the secrets behind the success of the pre-fabricated, demountable house.

Manufacturers of pre-fabricated, demountable units have given careful

Typical tool house, 12 by 22 feet, erected in 5½ sections and assembled in a day by a four-man crew. Hundreds of tool houses of this design have been giving good service in the oil fields. Cost is approximately $700.



THEY'RE GUARDING AGAINST *Casing Collapse!*

If casing should collapse in the hole these days, it would mean a costly delay in finding new oil reserves—loss of scarce materials and man-hours. That's why the work of these two Republic inspectors is doubly important.

The man at the left cuts off *each end* of *every length* of Republic Electric Weld Casing and passes them to the second man for the Crush Test. After crushing, each piece is closely inspected for strength in *both steel and weld.* This is just one of the special ways Republic assures high collapse resistance.

Other tests of equal exactness also assure you that Republic Electric Weld Casing makes up uniformly, gains speed at the joints, and has high pull-out strength.

There are important advantages in specifying other Republic products, too—the Republic Alloy Steels, Sheets and Plates, Electric Weld Line Pipe, Electrunite Heat Exchanger Tubes and Upson Studs, Bolts and Nuts.

The popularity of Republic Casing and Tubing resulting from performance records of more than 50,000,000 feet in service has made Republic a favorite supplier in the oil country. Just specify Republic on your next order and you'll see why.

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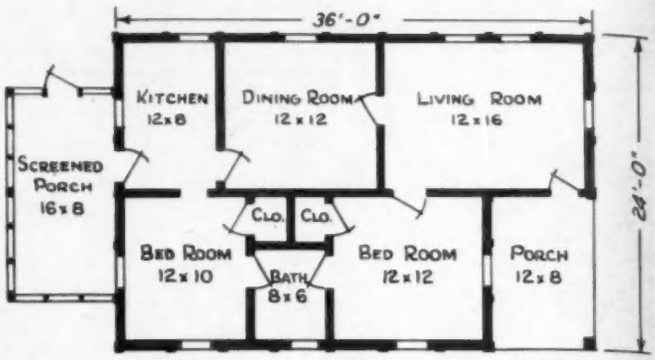
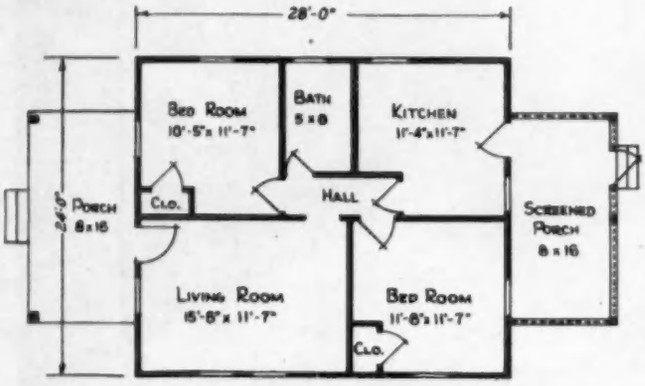
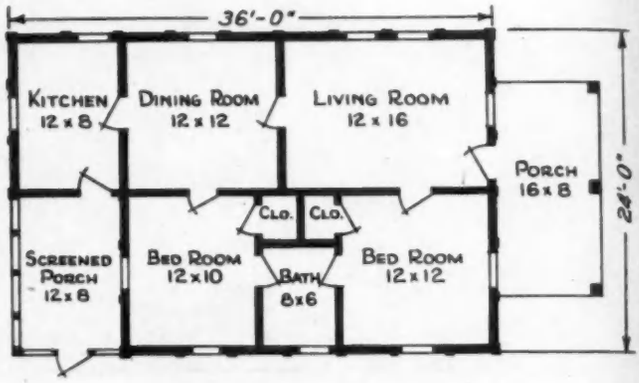
REPUBLIC *Electric Weld*

NORMALIZED CASING AND TUBING

LINE PIPE







Typical 4-room and bath pre-fabricated, demountable housing unit used extensively in oil fields. It has asbestos siding, includes two bed rooms, built-in features and is complete with plumbing, wiring and painting. Approximate cost is $3300 and can be erected in about 10 days by a four-man crew. The three floor plans give an idea of the unit's "livability" and "changeability." Floor at lower left is designed to conform with WPB specifications, which require contiguous kitchen and bath to conserve plumbing material.

study to every phase of oil field housing. Not only must units be rugged and dependable, they must be adaptable to varying conditions. Frequently houses are erected in as widely separated climates as Michigan and South Texas, yet are made up of sectional units manufactured alike. Where climatic conditions require, buildings are insulated. They must be heavy enough to resist the elements, yet without unnecessary weight which would increase transportation costs. Sections must be designed so that when they are assembled into a house their joints will fit tight, offering a wind and dust-proof wall. Materials must be of long life and easily dismantled so that the units may be moved time after time with minimum depreciation. Dependable manufacturers have taken all these points into consideration with the result that oil field operators can specify their climate and the manufacturer will supply them with units that meet the exigencies of the situation.

General Specifications

General specifications for a widely used oil field unit where all material was tested and proved before final adoption, follow:

Flooring joists 2 x 8's, 24-inch on center. Rafters 2 x 3's placed 24-inch on center. All floors, siding, interior and exterior trim are clear kiln dried yellow pine. Inside doors are fine panel, clear white pine. Rear outside doors are three cross panel, white pine, with four lights of glass above. Front doors have one panel below twelve lights of glass. All windows are of the twelve-light type made of clear white pine. Glass in these and doors in all black, puttied. All windows are dipped before glazing to insure long life and to prevent deterioration.

Wall panels are made in uniform size, 4 x 8 feet and are interchangeable. Purchaser can specify his own arrangement of doors and windows. Wall studding is 2 feet x 3 inches, spaced 24 inches, with a double stud every 4 feet. Outside window and door frames are made, then built into sections with glass and hardware factory applied. All joints, vertical and horizontal, are of tongue and groove type, to make the wall wind and dust proof.

Roofs are sheated solid with 1 x 6 feet, center matched, so that either roll roofing or shingles of any type can be applied. Floors, ceilings, roofs, and all walls are built in sections and are practically 100 per cent salvable, and all lining, which is an insulating board, is installed at plant so there is no unnecessary labor in the field. This also makes it possible to take the house down without losing any of the lining or other inside material.

Foundations are usually constructed of materials obtainable in the districts where houses are to be erected. Wood blocks, poured concrete or cement blocks are all satisfactory.

Manufacturers have designed units to fill specific needs such as residences with two rooms and up; boarding and bunk houses; recreation halls, warehouses, field offices, garages, tool houses and other small buildings used in the oil fields.

Manufacturers of pre-fabricated, demountable houses advance five reasons why this type unit should attract the oil operator:

1. Houses or parts of houses are manufactured in advance and kept in stock for immediate delivery.

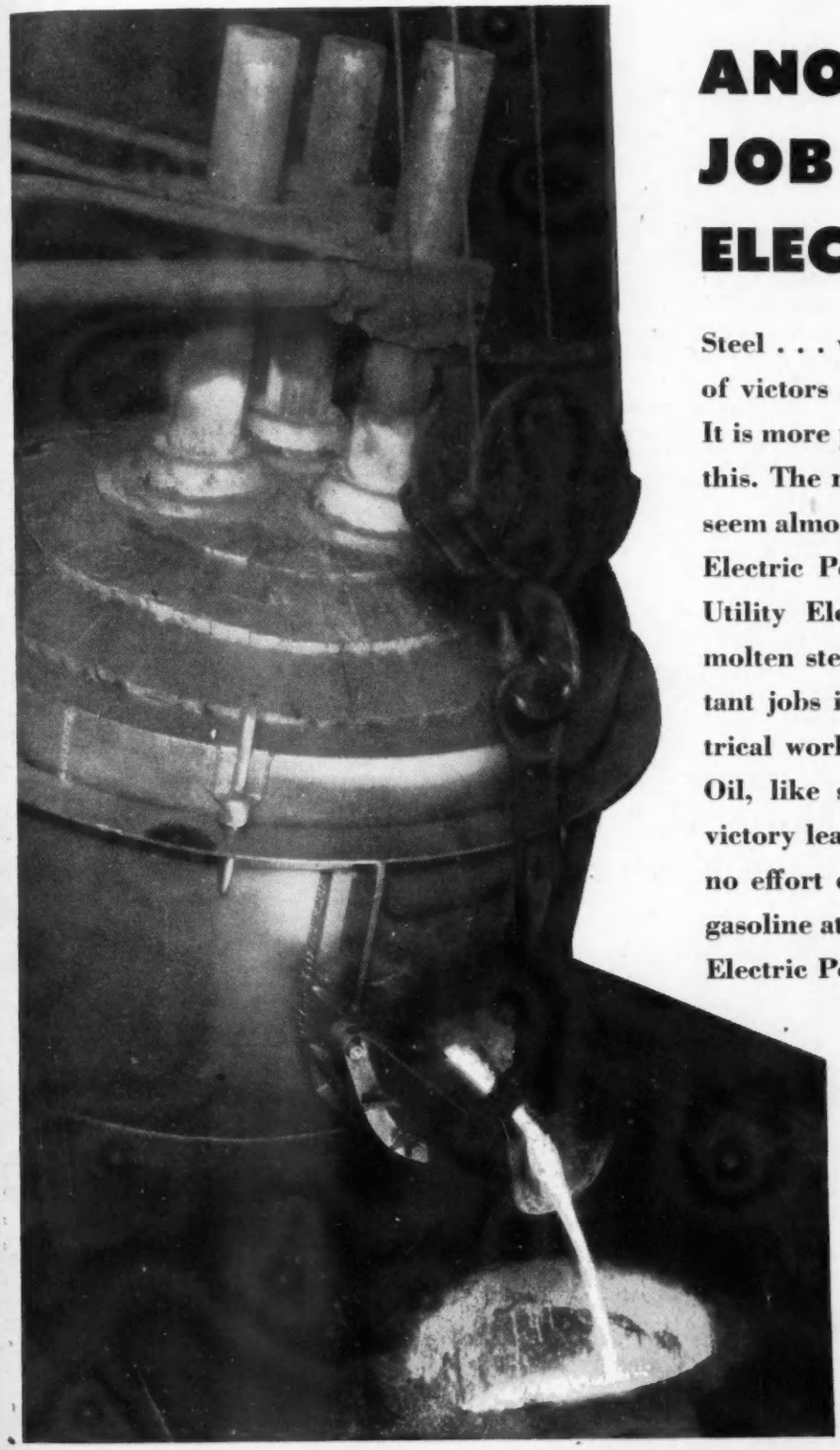
2. High quality at low cost due to mass production techniques.

3. High salvage value. A pre-fabricated house can be demounted and re-erected, including hauling of the house and new foundations, for about 30 percent of its original cost.

4. A house manufactured by a reliable dealer is a standard of quality. Because of his large investment in plant facilities he has a natural incentive to provide quality, in order that he may expect repeat business.

5. Standardized quality facilitates oil companies' purchasing agents' work, because they can obtain a complete "turn-key" house by a single purchase order, eliminating guess-work, "watch-dog" supervision over erection, and tedious detail. Oil companies with extensive experience in standardized qualities know what to expect in purchasing pre-fabricated, demountable units and it gives them an opportunity to standardize their houses and other units in various fields regardless of location.

Molten Steel . . .



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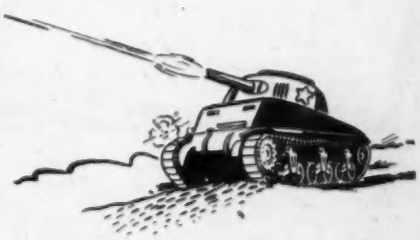
Steel . . . white molten steel. The weapon of victors . . . the shield of great nations. It is more precious than gold at a time like this. The need for steel and its advantages seem almost endless; which goes for Utility Electric Power, too. For as you can see, Utility Electric Power is used to make molten steel—one of hundreds of important jobs it performs in our modern electrical world.

Oil, like steel, is also a vital weapon—victory leans heavily on it. And that's why no effort can be spared to obtain oil and gasoline at this time. In this respect, Utility Electric Power is again indispensable, and we hope you will investigate its advantages when needing power to help produce more oil and gasoline for Victory.



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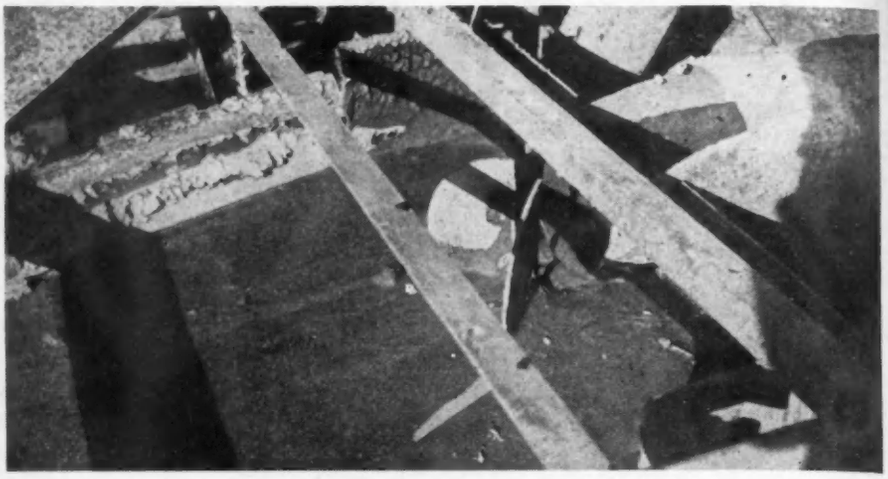


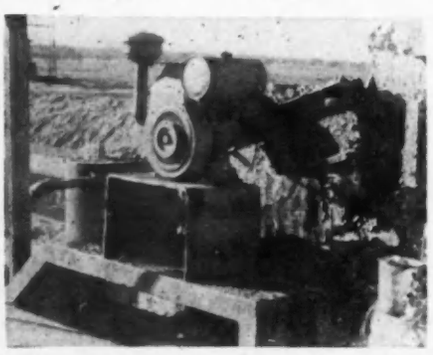
With a gap between them, these two adjustable vanes divide mud flow into three streams, insuring complete spread across screen area and reducing possibility of slugs with consequent mud loss.

systems where the mud is first emptied into a wide flume, then into the shaker, it has at least one disadvantage in that the returning fluid does not spread out evenly over the surface of the shaker screen, sometimes resulting in inefficient separation of mud and cuttings.

Solution of this problem lies in dividing the flow at the point where it falls upon the screen. This may be done by welding two steel vanes on the solid portion of the shaker immediately above the screen portion. Centered in the line of flow, the vanes are separated so the fluid is divided into three streams, one entering between the vanes and two being diverted across either side of the screen. Some experimenting may be necessary before the vanes are properly located to give best results for the conditions existing in the particular set-up. The vanes may be held in the mud stream by hand, and the angles shifted until the optimum diversion of flow is obtained, then with a sharp steel scribe, the exact position for welding may be marked on the steel base plate. When the rig is next shut down, the plates then may be welded in place. For greater rigidity of the plates, to insure against injury to the unit when the shaker is moved, a short steel bar should be welded across the tops of the two vanes midway between lead and downstream edges of the upright sections.

4. POWER UNITS

Mower Unit Replaces Damaged Turbine



Quickly "borrowed" from the lease office yard lawnmower, this engine keeps shale shaker running.

FAILURE of the turbine normally used to drive the shale shaker on this rig could not long stop drilling operations. By robbing the gasoline-engine driven lawnmower at a nearby company camp, and setting the unit on the turbine base, with an improvised V-belt pulley to take the place of the former blade drive pulley, the shaker was again put into service, pending receipt of the rebuilt turbine.

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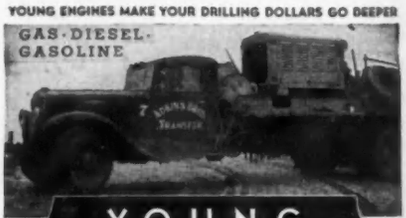

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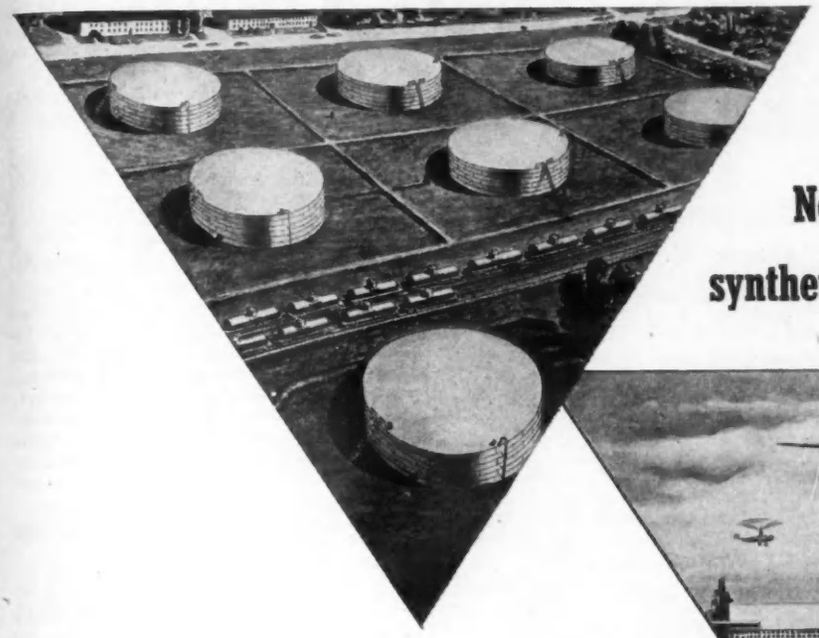

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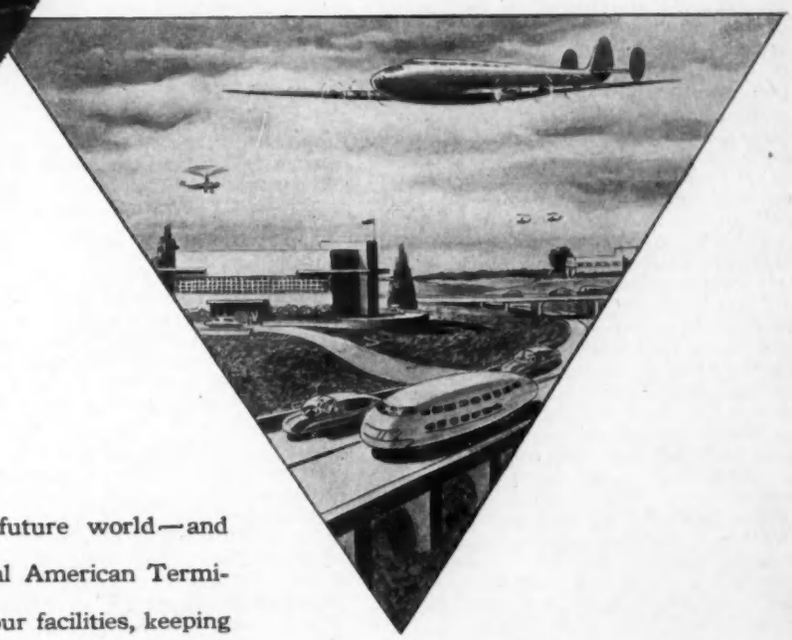

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Recruitment Plan Would Forestall Disaster in District 3

Sub-Committee survey shows two thirds of derrick men subject to draft; deferment asked for workers over 26

By A. R. McTEE, Staff Writer

IN AN effort to forestall a disastrous situation in District 3, a condition that might result in the shutting down of many rigs, the Production Manpower Sub-Committee of PIWC for this district has set up a recruitment program which it hopes will mean more workers for oil field activities. This action was decided upon at a meeting in Houston, late in March. Immediate steps were taken to perfect an organization and the plan was put into operation on May 1.

Also, an over-all picture of the manpower situation in District 3 has been obtained through questionnaires directed to oil producers, drilling contractors and oil field servicing companies. As a result of the survey, just completed, a request is now being made to the War Manpower Commission and the Selective Service that derrick men 26 years old and over be placed on the critical occupations list, a necessary step if drilling is to continue at anything like the rate required.

Two out of every three derrick men in the district are subject to the draft, as shown by the survey; and if these men are taken into military service there is likely to be widespread shutting down of rigs. The recruitment program cannot possibly offset drafting of derrick men. Because of the long, special training required for derrick work, the physical requirements, and the tremendous amount of upgrading that has already taken place in the expanded drilling program, it is impossible to replace men already holding these jobs.

Shut Downs Threatened

The survey reveals that 44 rigs would have to shut down if all men under 26 were called. However, above 26 years, the threat becomes deadly serious: If all men under age 30 were inducted, 122 rigs would have to stop work; and if the age is increased to all men under 38, it is likely 244 rigs would have to be stacked. The latter figure represents slightly more than half the rigs covered by the survey! In view of this showing, the committee stated that the request that drillers be put on the critical occupations list might be waived for men under 26.

Present shortage of help is emphasized by the fact that the average number of men per rotary rig is now 15. Normally, 18 men are required to keep a rig going 24 hours a day, including maintenance and supervision employes. The nature of drilling requires a full crew for efficient progress, since each man is necessary before the others can perform their duties in the best manner.

The manpower problem will become worse unless more help is made available, the survey shows. Anticipated needs during the second quarter of the year show a considerable increase over the first quarter in both drilling and producing operations. In production 298 more men will be required during July, August and September than for April, May and June. Also in drilling, 56 additional employes will be needed. Only in servicing is there an anticipated drop, 62 fewer men than for the first quarter.

Comments by heads of servicing organizations indicate, however, that these companies are finding it difficult to keep up their standard of performance: "Operating 7 men short in the field," "units are operating with 5 men short at present," and "takes 3 years to train engineers," "have 2 men under 38 years old impossible to replace," are typical of the remarks made on the questionnaires.

On the drilling operations reports, comments tell the story candidly:

"Have rigs operating with 12 men due to manpower shortage; anticipating loss of 29 men; need 46 men for full strength crews; operating 18 hours daily due to manpower shortage; one rig down awaiting crew if available; would like to start another rig if crew can be found; one rig shut down due to lack of men; now short 6 men."

Likewise, similar remarks are noted on producing needs:

"At present need 20 men; will need approximately 48 additional men if 50-well schedule to be drilled before the end of this year are completed; will try to use women if possible, must replace all men lost if operations are to continue; cannot anticipate when men 18 to 36 will be called, have 5 in this group who must be replaced; immediate manpower needs, 4 pumpers and guagers, 2 lease roustabouts, 3 complete drilling crews, 1 lease foreman."

The picture given by the survey is believed to be conclusive since replies were received from more than half of the companies contacted. Rotary rigs covered by the reports totaled 420; cable tools, 27. Total employes covered in drilling and producing operations were 23,803.

Recruitment Program

The recruitment program has been placed under the supervision of Ray H. Horton, vice-chairman of the Production Manpower Sub-Committee and Coordinator of the Recruiting Program, 805 Niels Esperson Building, Houston, Texas. He was formerly regional industrial relations manager for Humble Oil & Refining Company, with headquarters in the Tyler, Texas area. He

DISTRICT 3 PRODUCTION MANPOWER SUB-COMMITTEE

Addresses of members of District 3 Production Manpower Sub-Committee that should be contacted with respect to needs for employes in drilling and production operations are:

ARKANSAS

El Dorado—J. F. Hansard, Lion Oil Refining Company, Exchange Building.

TEXAS

Corpus Christi—Harold Decker, Seaboard Oil Company, Box 1577.

Dallas—A. E. Chester, Magnolia Petroleum Company, Box 900 (for production personnel). Brad Mills, American Association of Oil Well Drilling Contractors, 1048 Gulf States Building (for drilling and oil well servicing personnel).

El Campo—Freeman Brown, Halliburton Oil Well Cementing Company.

Fort Worth—A. H. Rowan or Mark Hart, Rowan Drilling Company, 903 Commercial Standard Building.

HOUSTON—K. B. Knox, Petroleum Well Servicing Company, 4810 Griggs Road (for drilling and oil-well servicing personnel). L. J. Whetsell, The Texas Company, Texas Building (for production personnel).

Phillips—C. L. St. Clair, Phillips Petroleum Company, Box 337 (for Panhandle area).

San Antonio—W. C. Morris, Allen & Morris, Alamo National Bank Building.

Tyler—J. R. Dunn, Humble Oil & Refining Company, Box 2025.

Wichita Falls—Fred Schmann, North Texas Oil & Gas Association, City National Bank Building.

LOUISIANA

Houma—D. W. Rhea, The Texas Company, Citizens Bank Building, Box 951.

LaFayette—T. H. Harder, Stanolind Oil & Gas Company, Box 583.

Lake Charles—R. M. Berry, Shell Oil Company, Inc., Box 1361.

New Orleans—J. P. Chambers, The California Company, 1818 Canal Building.

Shreveport—S. P. Davies, N. H. Wheless Drilling Company, 214 Commercial Bank Building.

NEW MEXICO

Hobbs—Donald A. Powell, Drilling & Exploration Company, Box 1575.

Roswell—Bert Aston, Franklin Petroleum Corporation, 321 White Building.

started working in the oil fields as a rough-neck, then became a driller and has had wide experience in field operations. He is now on temporary leave from the Humble Company, to manage the recruitment program.

A study was made of the California plan of enlisting oil field workers; the necessary approval from various offices of the War Manpower Commission in District 3 was obtained, and the membership of the Manpower Sub-Committee was increased sufficiently to give adequate representation throughout the district. PAW assisted in formulating the plan and has assured the committee of its continued cooperation.

Procedure is as folows: Any producer, drilling contractor, or servicing company needing workers will contact the Manpower Sub-Committee member in his area (see accompanying list giving names and addresses) stating his needs, on a form 'Request for Personnel." Any prospective employe known to the committee member is sent to the company making the request, with an "Introduction" from the committee member. If the man is hired, his employer fills out a post card to that effect and returns it to the committee member introducing the employe. From these cards the committee member makes up his weekly report to the central office in Houston.

DRILLING OPERATIONS

(Survey made by the PIWC Manpower Sub-Committee, PAW District 3)

Companies reporting	75
Rotary rigs in operation	420
Cable-tool rigs in operation	27
Average number of men per rotary rig	15
Average number of men per cable tool rig	6
Average hours worked per week per employe	55.3
Employes	6802
Employes under age 18	111
Employes aged 18-26	381
Employes aged 26-30	729
Employes aged 30-38	1963
Employes aged 38 and over	2486
Employes classified 4F	439
Women employes	10
Rigs that will shut down if all men are drafted under age 38	244
Rigs that will shut down if all men are drafted under age 30	122
Rigs that will shut down if all men are drafted under age 26	44
Derrick men subject to draft	699
Anticipated manpower needs during April-May-June	995
Anticipated manpower needs during July-August-September	1051

(25 companies representing 2801 employes reported as having filed replacement schedules.)
(47 reporting companies representing 3769 employes have not filed replacement schedules.)

Burden of the program falls on members of the enlarged committee, of which there are now 19, located as follows: one in Arkansas, eleven in Texas, five in Louisiana, and two in New Mexico. Each will act as a recruiter of manpower in his assigned area and will assist producers, drilling contractors and oil field servicing companies in obtaining workers.

Responsibilities of recruiters, as set out in their letter of instructions, are:

1. Contact all sources of manpower in area and work with all agencies in giving publicity to and enlisting cooperation. Suggested points of contact

PRODUCTION OPERATIONS

(Survey made by the PIWC Manpower Sub-Committee, PAW District 3)

Companies reporting	111
Employes	17,001
Average hours worked per week per employe	49.2
Employes under age 18	88
Employes aged 18-26	368
Employes aged 26-30	1042
Employes aged 30-38	3839
Employes aged 38 and over	9808
Employes classified 4F	769
Women employes	1087
Women in field production	28
Women that could be used in field operations	137
Anticipated manpower needs during April-May-June	909
Anticipated manpower needs during July-August-September	1157

(45 companies representing 11,202 employes have filed replacement schedules.)
(66 companies representing 5765 employes have not filed replacement schedules.)

are: United States Employment Service offices; local draft boards; Veterans of Foreign Wars; American Legion, Army, Navy or Marine Hospitals; chambers of commerce; other industries that may have cut-backs or lay-offs; other companies in the oil industry.

2. Attempt to fill all orders to the best of his judgment, taking into consideration the filling of the most critical jobs first, and the order in which requests for personnel are received.

3. If the Manpower Sub-Committee member is unable to fill orders in his assigned area, either through his office or other facilities within his area, he should wire the office in Houston, giving portion of orders he is unable to fill. The central office will, in turn, direct these orders to other members of the subcommittee; also notifying the area directors of the United States Employment Service in their area. The subcommittee member in cooperation with the area directors of the United States Employment Service will attempt to fill the orders.

Medical Examinations

4. He should have physical examinations made when requested by employing companies. It should be understood by examining doctors that charges

OIL WELL SERVICING COMPANIES

(Survey made by the PIWC Manpower Sub-Committee, PAW District 3)

Companies reporting	18
Employes represented	2009
Employes under 18	117
Employes aged 18-26	135
Employes aged 26-30	203
Employes aged 30-38	482
Employes over 38	604
Employes classified 4F	352
Women employed	118
Units in operation	376
Average number of men per unit	6
Average hours worked per week	60.6
Anticipated manpower needs for April-May-June	241
Anticipated manpower needs for July-August-September	179
Units to be shut down if all men under 38 years old are drafted	198
Units to be shut down if all men under 30 years old are drafted	97
Units to be shut down if all men under 26 years old are drafted	50

should be billed direct to the company involved.

5. A report must be forwarded to the central office promptly each Saturday at the close of the week's business. In order for the Committee to determine the advisability of continuing this program, accurate information must be kept on all districts.

6. The importance of returning the postcard attached to the introductory note should be impressed on companies requesting manpower. This is the only means by which the sub-committee member can determine the actual number of employments.

7. In order to be certain that all War Manpower Commission and United States Employment Service regulations are complied with, each sub-committee member should contact his local United States Emloyment office or area director, and determine the requirements in regard to certificates of availability. There are different War Manpower Commission stabilization plans in effect in different areas of District 3. Any person employed for work outside of the area should be cleared through the United States Employment Service. The United States Employment Service referral card serves the same purpose as a certificate of availability. United States Employment Service referral cards should, in all cases, be returned to them.

8. Although the recruiting program is to be conducted on a voluntary basis, any committee member put to abnormal expense for reasons beyond his control should submit a statement, explaining such expenditure, to the central office for payment.

Increased May Allowables Are Listed for Louisiana

May oil allowables for Louisiana have been set by the minerals division of the state conservation department at 392,321 barrels daily, a gain of 19,266 barrels over the April figure of 373,055 barrels.

Allowables in barrels by districts are: Houma, 64,139; Lafayette, 106,518; Lake Charles, 66,816; New Orleans, 77,123; Monroe, 30,868; Shreveport, 26,857.

Larger field allowables included: Erath, 16,187; LaFitte, 14,079; Paradis, 12,905; Ville Platte, 11,484; Haynesville, 10,140; Nebo-Hemphill, 10,648; Rodessa, 10,023.

Controls on Export of Oil Products Tightened

Tightening controls on export of oil products, the Foreign Economic Administration announced last week that, effective May 6, individual licenses or release certificates would be required for all exports regardless of value to destinations (other than Canada) of kerosine, high and medium octane aviation motor fuels, natural gasoline and other motor fuels and gasoline.

Shipments of those commodities which were on dock, on lighter, laden aboard the exporting carrier, or in transit to ports of exit pursuant to actual orders for export prior to the effective date of the order may be exported under the previous general license provisions, as may shipments moving to a vessel subsequent to the effective date of change pursuant to OPT permits issued prior to May 6.

Pipe Line Review

Clean-up Work in Progress On Hugoton-Guymon Line

Clean-up work along the right-of-way of Cities Service Chemical & Transportation Company's natural gas gathering system from the south area of the Hugoton gas field to Guymon, Oklahoma, including 60 miles of main and lateral lines, will be concluded about the middle of May, the work having been delayed on account of unseasonable weather, Anderson Brothers Construction Company, contractors, announced.

At the same time the contractors announced they have completed laying a 55-mile gathering system in the Hawkins field of East Texas for Warren Petroleum Company.

Pipe Lines Handling More Oil With Revenue Lag

The Interstate Commerce Commission reported at the end of April that 47 major pipe-line companies handled 17.8 percent more crude oil and products in 1943 than in the previous year, although total revenues increased only 13.4 percent. Number of barrels handled by trunk lines in 1943 totalled 1,908,417,082, as compared with 1,619,579,000 barrels in 1942. Transportation revenues amounted to $258,606,801 and $227,967,538 respectively.

Humble Pipe Line Company reported the highest traffic and revenue for 1943, with $22,848,079 charged for moving 188,089,693 barrels, a traffic increase of 36.7 percent over that of 1942. Sinclair Refining Company was second in revenue last year, with $21,575,928 on 107,824,593 barrels; while Buckeye Pipe Line Company was second in traffic volume, having moved 140,860,884 barrels with revenue $7,087,423.

California Standard Advances Geologists

Standard Oil Company of California has announced appointment of George M. Cunningham as general manager of exploration. He was formerly chief geologist.

Moving up to replace Cunningham as chief geologist is Dr. William S. W. Kew, formerly the company's district geologist at Los Angeles.

A graduate of the University of California, Cunningham has been with the company since 1921. He has done geological work in many parts of the world and was San Joaquin district geologist during the initial development of Kettleman Hills.

Kew holds a Ph.D. in geology from the University of California. He was with the United States Geological Survey for several years before he joined Standard Oil Company of California in 1925. He is widely known in the oil industry as a writer on petroleum geology.

G. M. Cunningham

S. W. Kew

Roumanian Pipe Lines Reported Completed

A Bucharest newspaper reports that two pipe lines have been completed and put into service between the Romano-Americana refinery in the Ploesti area and the Danube port of Giurgiu, 40 miles south of Bucharest. The same paper reports that a natural gas line has also been completed between Bucharest and Moinesti, 160 miles north of the capital, in the province of Prut, on the east slope of the Carpathian Mountain range. In addition, work is being rushed on construction of an oil line paralleling the railroad between Cernavoda, on the Danube, to Constanta, on the Black Sea.

Some Taber Oil Now Moving by Truck

Oil from the Taber field is being moved to Lethbridge, Alberta, by means of two tank trucks. Otherwise, the Taber field is still virtually shut down, because of lack of market outlets for its low-gravity oil.

Reports that the refinery at Calgary would handle some of the Taber oil are denied. The trucked oil is being stored at Lethbridge refinery of Pacific Oil & Refining Company. Lighter oil from wells in the Del Bonita field will be mixed with the heavy Taber oil at the refinery.

More Taber oil will shortly find its way to market as a result of the construction of a loading rack, served by a spur from the Canadian Pacific line to be completed in April.

Line Completed

Sharman & Allen, Houston pipe-line contractor has completed 38 miles of 8-inch oil line for Gulf Refining Company, connecting to the Big-Inch at Longview, Texas.

Refiners Suggest Policy Ideas to Maloney Group

Gulf Coast Refiners Association has submitted to the Maloney Committee for investigation of government oil policy a memorandum seeking three objectives:

1. Regarding transportation subsidies. Application of the transportation subsidy program evenly and universally to all areas in which refiners are forced to go beyond normal crude oil supply sources, instead of singling out certain refining districts for such benefits. The group complains that government-sponsored pipe lines are depriving them of normal supply and forcing them to turn to new sources, which however are prohibitive in over-all cost, considering transportation.

2. Regarding isolated crude raises. Stop the spot increases in ceilings of crude oil prices, which in many cases must be absorbed by independent refiners, jeopardizing the competition they assure the industry.

3. Regarding foreign policy—If the government adopts a foreign policy which has the effect of supplying foreign markets from foreign sources rather than from United States refineries, thus ultimately restricting them to the domestic market, then the government should at the same time effectuate a domestic policy which will enable smaller refiners to stay in business, along with smaller producers and marketers, to assure vigorous competition within the industry.

The association also called for revelation of government plans or, in absence of any present plans, the adoption of a definite postwar program for operation of the extensive pipe-line networks and the many tankers, building of which has been sponsored by the government. Such program should have due regard to the interests of all phases and elements in the industry, the memorandum declared, with the view toward maintaining competition in the industry and thus serving the national welfare.

California Oil Producers Elect Officers

Oil Producers Agency of California held its annual meeting April 19, and elected the following officers: C. P. Watson, Seaboard Oil Company, president; W. C. Whaley, Barnsdall Oil Company; H. E. Woodworth, Safe Oil Company; R. H. Garrison, and C. C. Spicer, Republic Petroleum Company, vice presidents; Rush M. Blodget, Blackfoot Petroleum Company, executive vice president; W. A. Russell, Seaboard Oil Company, secretary-treasurer; and Verne Harrell, Bankline Oil Company, assistant secretary-treasurer. Ed Crail was added to the board of directors.

Drilling Contractors Ask PIWC Representation

Directors of the American Association of Oil Well Drilling Contractors have dispatched a resolution to Administrator Ickes calling attention to the fact that this segment of the oil industry is the only large group not represented on the Petroleum Industry War Council. The resolution specifically requests that Arch W. Rowan, president of the association, be invited to join PIWC and that the equitable interests of the drilling contractors be more fully recognized during the war period.

Moffett Again Demands That Ickes Resign

James A. Moffett, former oil executive, renewed his demand for the ouster of Harold L. Ickes as Petroleum Administrator for War at a recent New York press conference, and also attacked British interference with the American oil industry. Ickes, by his support of the Arabian pipe line project, was declared by the former oil man to be "supporting a disgraceful cartel against freedom of action of any American oil companies in foreign markets" and through his foreign oil committee to be violating every "law of the United States government, the Sherman act, the Clayton act, and it has been forced through intimidation upon the American oil industry."

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VALVES

Output of Major Products Lower and Stocks Reduced

Latest statistics of the industry, covering the week ended April 27, gave noteworthy evidence of the current economy of shortage in the industry, declines having been indicated in practically all items of production and changes in stocks. Crude runs to stills were substantially lower than in the preceding week. Refinery output of each of the major products was down from the previous week and there were withdrawals of all of those products from storage. Furthermore, there was a draft on crude storage in meeting the refinery demand for the raw material, even though the plants still were not processing enough crude. Production of crude was increased a little, in the unsuccessful effort to make supply equal the refinery demand.

U. S. crude output averaged 4,431,000 barrels daily in the week of April 27, up 4000 from the previous week and within 5000 barrels of the all-time peak reached last November. It was 512,000 barrels a day or 13 percent greater than production in the week ended April 29 last year.

Crude runs to stills, having averaged 4,300,000 barrels daily, were down 108,000 from the week before, although 445,000 daily or 11.4 percent above runs in the corresponding week last year.

It continued necessary to draw on crude storage in meeting plant requirements in the week ended April 22, the Bureau of Mines report for that period showed. Stocks came down at the rate of 80,000 barrels daily and at the end of the week totaled 233,632,000 barrels. That amount was 8,403,000 barrels or 3.5 percent less than the 242,035,000 barrels on hand April 24 last year.

Production of gasoline, including natural blended at refineries, averaged 1,875,000 barrels daily in the week of April 27, down 54,000 from the week before, but 331,000 barrels a day or 21.5 percent above output in the like week a year ago. Stocks of finished and unfinished gasoline were reduced seasonally at the rate of almost 40,000 barrels per day, having declined to 88,462,000 barrels. That amount was about 1,000,000 barrels or 1 percent less than the 89,576,000 barrels on hand at the corresponding time last year.

Production of gas oil and distillate fuel, in averaging 612,000 barrels daily in the week ended April 27, was 32,000 a day lower than in the previous week but 82,000 daily or 15.6 percent higher than in the corresponding week last year. Stocks of these light fuel oils were drawn upon during the week at the average rate of 37,000 barrels daily and came down to 30,236,000 barrels, practically the same amount as held at the corresponding time last year.

Residual fuel oil production averaged 1,199,000 barrels per day in the week of April 27, down 22,000 from the week before but 29,000 a day or 2.4 percent above output in the like week last year. The stocks of residual were reduced during the week at the average rate of 154,000 barrels daily and then stood at 49,985,000 barrels, which amount was 17,070,000 barrels or 25.5 percent less than the 67,055,000 barrels in storage April 29 last year.

Oil Pays One Fourth of All Oklahoma Taxes

The oil industry in Oklahoma is supplying more than 25 percent of the state's total revenue, according to a tax commission report. The state received and spent $96,749,073 during the fiscal year ending June 30, 1943, of which $25,755,501 was received from oil industry sources.

Crude Oil Production in the United States

(Estimates compiled by The OIL WEEKLY. All figures indicate daily averages, in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED May 6	April 29
Alabama	50	25
Arkansas	79,550	79,550
California	833,650	834,400
Colorado	8,300	8,200
Florida	45	45
Illinois	215,500	206,500
Indiana	13,700	13,850
Kansas	267,200	273,500
Kentucky	19,900	24,350
Louisiana	371,150	358,650
North Louisiana	75,350	76,150
South Louisiana	295,800	282,500
Michigan	52,100	48,500
Mississippi	42,400	43,900
Missouri	100	100
Montana	23,800	23,490
Nebraska	1,100	1,150
New Mexico	113,000	113,000
New York	13,550	13,750
Ohio	8,850	8,350
Oklahoma	335,500	334,100
Pennsylvania	42,350	41,700
Tennessee	30	30
Texas	1,946,500	1,910,200
Upper Gulf Coast	519,100	518,700
East Texas Field	362,500	362,000
Rest of Eastern Texas	132,700	127,500
Lower Gulf Coast	205,300	198,250
Southwest Texas	78,100	75,300
South Central Texas	19,800	19,650
West Texas	392,400	374,100
North Texas	145,300	143,700
Panhandle	91,300	91,000
West Virginia	9,250	8,700
Wyoming	96,650	98,700
Total United States	4,494,225	4,444,740

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod. Barrels Daily	Crude Oil Prod. Week Ended	Runs to Stills Barrels Daily	Runs to Stills Week Ended	Crude Stocks Barrels	Crude Stocks Week Ended	Gasoline Stocks Barrels	Gasoline Stocks Week Ended	Gasoil and Distillate Stocks Barrels	Gasoil and Distillate Stocks Week Ended	Residual Fuel Oil Stocks Barrels	Residual Fuel Oil Stocks Week Ended
Highs:												
1941	4,337	11-22	4,120	10-18	266,187	3-29	99,727	3-29	[1]54,983	11-15	102,448	1- 4
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	49,861	11-14	95,857	1- 3
1943	[1]4,436	11-13	4,331	12- 4	245,752	5-29	94,159	3-20	46,187	11-27	72,881	1- 2
1944	4,432	4-15	[1]4,453	1- 1	240,992	1- 1	89,162	4- 1	42,310	1- 1	57,330	1- 1
Lows:												
1939	[2]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 8
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,381	4-12	90,914	7-12
1942	3,297	7- 4	3,393	5-23	231,896	12-12	75,934	12- 5	29,240	4-25	72,962	12-26
1943	3,821	1- 9	3,579	3-13	232,191	1- 9	68,182	10-16	30,732	4- 3	57,596	12-25
1944	4,357	1- 1	4,228	2-12	233,632	4-27	76,302	1- 1	30,232	4-27	49,985	4-27

TRENDS OF 1943 AND 1944

Trends in Week Ended:	Crude Oil Production Daily	Crude Oil Runs to Stills Daily	Crude Oil Stocks Week End	Gasoline Production Weekly	Gasoline Stocks Week End	Gasoil and Distillate Production Weekly	Gasoil and Distillate Stocks Week End	Residual Fuel Production Weekly	Residual Fuel Stocks Week End
1943:									
January 2	3,871	3,734	233,938	10,957	82,420	4,285	42,913	7,683	72,881
January 30	3,826	3,698	233,863	10,339	88,830	3,888	37,057	7,452	70,763
February 27	3,873	3,709	235,217	10,566	93,157	4,230	32,939	7,839	70,140
March 27	3,896	3,742	239,126	10,231	94,079	3,541	30,980	8,018	67,938
April 24	3,913	3,737	242,035	10,583	91,001	3,954	31,142	8,168	67,455
May 29	3,970	3,679	245,752	10,656	83,937	3,798	32,274	7,672	67,682
June 26	3,955	4,015	242,657	11,092	79,589	3,876	34,044	8,126	67,960
July 31	4,133	3,788	238,420	11,127	74,977	3,765	36,363	8,478	66,877
August 28	4,196	4,227	236,170	12,420	72,525	4,351	37,928	8,732	67,250
September 25	3,344	4,156	233,013	12,206	70,024	4,608	40,328	8,560	66,659
October 30	4,383	4,176	237,219	12,813	69,297	4,642	44,591	7,968	63,833
November 27	4,414	4,261	239,761	12,638	69,980	4,379	46,187	8,633	62,143
December 25	4,363	4,185	241,310	12,597	74,024	4,457	43,791	8,689	57,596
1944:									
January 1	4,357	[1]4,453	240,992	13,192	76,302	4,575	42,310	9,141	57,330
January 29	4,409	4,359	240,251	13,427	81,085	4,054	37,266	8,889	52,857
February 26	4,423	4,377	237,137	13,183	85,248	4,558	33,766	8,952	51,387
March 25	4,385	4,443	236,285	13,362	87,287	4,979	31,319	9,013	51,669
April 1	4,383	4,435	234,667	13,824	89,162	4,450	30,530	8,367	51,326
April 8	4,416	4,354	234,172	13,161	88,100	4,702	30,478	8,541	51,072
April 15	4,432	4,447	234,188	13,784	88,778	4,565	30,561	8,933	[5]51,714
April 22	4,427	[5]4,408	233,632	[5]13,502	88,729	[5]4,512	30,495	8,552	51,061
April 27, 1944	4,431	4,300	.....	13,126	88,462	4,284	30,236	8,398	49,985
April 29, 1943	3,919	3,855	[4]242,035	10,807	89,576	3,706	30,674	8,198	67,055
Change:									
In week	+4	—108	—556	—376	—267	—228	—259	—154	—1,076
In year	+512	+445	—8,403	+2,319	—1,114	+578	—438	+200	—17,070
In year	+13.1%	+11.4%	—3.5%	+21.5%	—1.2%	+15.6%	—1.4%	+2.4%	—25.5%

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, April 24, 1943. [5] Revised.

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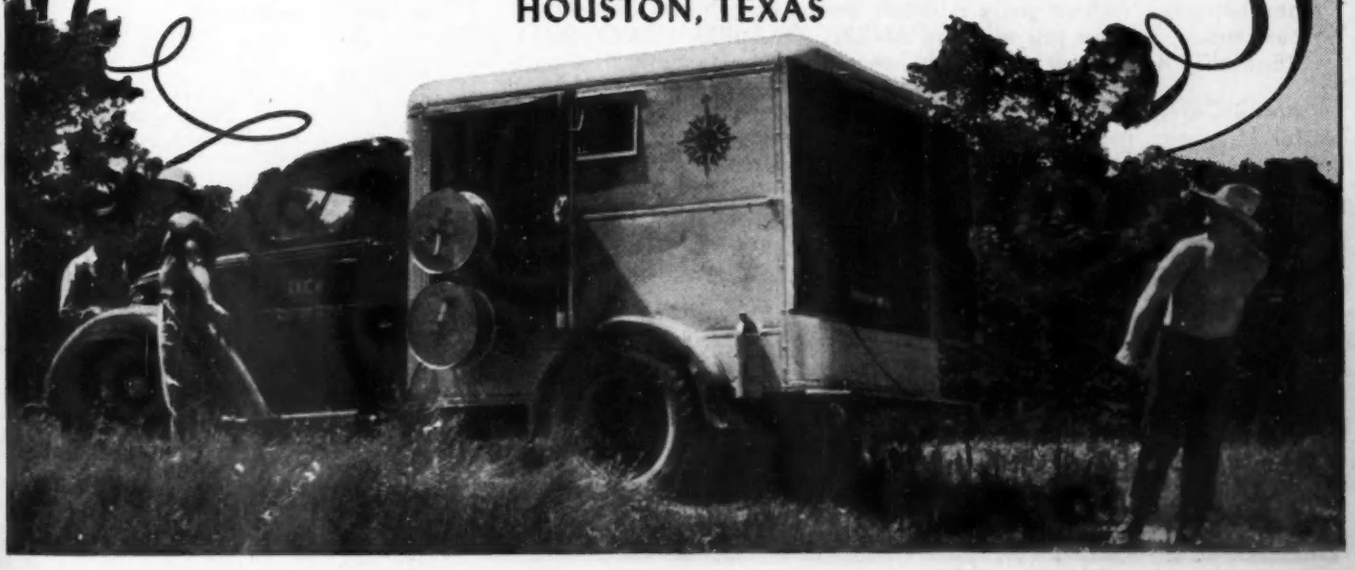

International Developments

Canol Project Completed With Opening of Refinery

The United States-built refinery at White Horse, Yukon Territory, on the Alaska Highway, was officialy opened April 30, bringing to completion the 22 months of construction of the Army-sponsored, government-financed, $130,000,000 Canol project for supplying oils for military needs in that region.

On February 18 final joints were welded in the above-ground, 595-mile, 4-inch, crude oil pipe line to White Horse from Norman Wells field, on the Mackenzie River. More than enough production for supplying the line and refinery was provided last year through drilling of about 30 wells.

Through a 1500-mile network of pipe lines also a part of the project, the new refinery will furnish aviation gasoline for planes using air fields between Edmonton, Alberta, and Fairbanks, Alaska; gasoline for trucks on the 1523-mile long Alaska Highway; and fuel for tractors and similar equipment employed in the district.

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Ecuador Production Greater in 1943

Ministry figures on petroleum production during 1943 have been released by the government of Ecuador, showing total yield to be 2,362,176 barrels for the year. This is an increase of 400,000 barrels over 1942. Value of the 1943 production, for computing taxes and duties, amounted to $3,291,041.12. Companies operating in Ecuador during the year included: Anglo-Ecuadorean, Ecuadorean Oilfields, Carolina, International Petroleum Company, Conception Ecuadorean Oilfields, and Petropolis Oil Company.

Panhandle Company Abandons Mexico Plan

Panhandle Producing & Refining Company has announced abandonment of plans to form a new company that was to have operated in Mexico. Reasons for giving up the plan were not stated. The management is continuing investigations of possibilities in Mexico.

New Company Town In Barco Concession

Colombian Petroleum Company, which operates the Barco Concession in Colombia, near the Venezuelan border, is constructing headquarters and housing facilities at Tibu, within the concession area. Headquarters are now located at Cucuta, capital of the department of North Santander. The new development at Tibu will include an airport and 800 dwellings for workers' families and operating staff.

It is expected that construction of the new town farther north will proceed to completion despite Cucuta's efforts backed by special offers to have headquarters kept there.

Ram River Field, Alberta Development in Prospect

Drilling operations are under way, at Ram River Oils Ltd. No. 3, in the foothills area west of Red Deer, Alberta, as a result of successful bailing tests of No. 2. The No. 2 discovery well, put down as a 1⅝-inch test hole, was completed in June, 1942, with a Devonian pay between 4250 and 4300 feet. The oil is 40-gravity and is under strong gas pressure. Efforts are being made to bring the well into commercial production, in spite of difficulties due to the small hole. Trouble is being experienced in shutting off Upper Devonian water and cleaning out the pay zone. The new well, an offset, will drill a large hole, and several more locations in the field will be made shortly.

New Geological map of South America Planned

The Geological Society of America is compiling a new geological map of South America, in which all governments of the continent are contributing information. It is expected that the preliminary map will be ready by the end of the year.

U. S. Field Operations

California

Bellevue Wildcat Confirms New Field in Kern County

A first production test of Superior Oil Company's Bellevue area wildcat, several miles southeast of Greeley field, Kern County, confirmed the opening of a new pool, producing from what is believed to be the Upper Stevens sand of Miocene age. Details are being withheld until final completion, but it is credibly reported the well flowed 350 barrels of clean, high-gravity oil. Similar recent discoveries in this district have greatly increased interest in its prospective possibilities, but so far the finds have been of sharply restricted areal extent.

This first completion is from only one of two sand bodies in the hole, both of which made good shows on drill-stem tests. Production is from an interval somewhere between 7900-8000 feet. On formation test last month of an Upper Stevens show at approximately 6580-6620 feet, the well was reported to have made in excess of 500 barrels.

Tejon Ranch, Kern County, once more is in the limelight this week with a wildcat performance as spectacular as any of the several that have punctuated the erratic course of persistent exploration thereabouts during the past decade. M. Metzenbaum's 3, 34-11-19, a mile west of Richfield Oil Corporation's Tejon field shallow production, blew out, making gas estimated as high as 35,000,000 feet daily and an undetermined flow of high-gravity oil. After some difficulty in regaining control preparations were begun for a production test. Approximately 90 feet of Chanac sand of Pliocene age is open in the hole, which is bottomed at 2680 feet.

Currently rated as California's biggest wildcat play, the Salton Sea area, Imperial County, exploration campaign in which a number of companies is participating, got under way this week when Standard Oil Company of California spudded Southern Land Company 1, 27-11-9. Pure Oil Company's Truckhaven Unit 1, 26-10-9, at last reports ready to spud, will be the second start. Blocking of acreage, which has been under way nearly a year, is still in progress with unusually stiff terms being demanded by landholders.

Contra Costa County: A wildcat seeking a new gas field in an area four miles southeast of Antioch will be drilled by Shell Oil Company. Materials are on location for Heidron 1, SW NE NE, 4-1-2.

Kern County: The extent and trend of the Buena Vista new pay horizon opened last month will be quickly determined. The first of ten comparatively close offsets staked immediately after the discovery will reach objective sands this week. This well is about a half mile to the north of Standard Oil Company's No. 54, the discovery well. A second, half a mile to the west, now is drilling; and locations have been made for four other more distant tests in sectors to the northwest, northwest and southwest, ranging from 1 to 4½ miles away.

East of the south edge of Midway-Sunset field, 4 miles from production, Tide Water Associated Oil Company, following completion of extensive surveys, has staked a wildcat located in SE NE SE 36-12-23.

Other interesting new Kern County wildcats started this week include Richfield Oil Corporation's Temblor Hills 1, SW SW NE 36-31-21; J. & S. Exploration Company's Crookshank 2, 19-30-38, on the desert north of Mojave; and Pacific Western Oil Corporation's M. Richardson 1, NE NW NE 24-3-21, south of South Mountain production.

Los Angeles County: Deepening of Roosa 1, discovery well of a new Aliso Canyon pool, bared another promising sand between 6946-7001 feet, with 22 feet of well saturated cores from a 29-feet recovery. The well, originally bottomed at 6627 feet, had been completed as a new discovery from a plugged bottom of 5830 feet, but although commercial production was obtained it was unsatisfactory on account of high water content.

Orange County: The nearest approach to right-angle drilling ever attempted in California is carrying out to sea Gilco, Inc. 1, Seal Beach tidelands wildcat, on a trajectory little more than 25 degrees off horizontal. With drilled depth past 6000 feet, the only difficulties encountered other than in normal drilling is that of obtaining surveys.

Ventura County: The deepest venture for some years in California, Standard Oil Company's Fillmore area wildcat, Fillmore Comm. 1, is drilling at 14,174 feet.

Rocky Mountain Area

Wyoming and Colorado Extensions Are Productive

Continental Oil Company's Unit 2, SW SW NE 23-44n-95w, second well to be drilled in the recently discovered Gebo Dome field, Hot Springs County, Wyoming, treated the Embar at 4534-4650 feet with 1000 gallons of acid and flowed initially 84 barrels of oil an hour. Before acidizing, the well produced at the rate of 21 barrels an hour. It was drilled to 4970 feet and plugged back to 4900 feet to complete. The well is ¼ mile north of the discovery, which was completed in Embar at 4735-4842 feet for an initial of 2900 barrels of 29-gravity oil in December last year.

Clarks Lake Test: Amerada Petroleum Corporation and Alder Oil Company's Galvin 1, SE SE SW 15-9n-68w, 6 miles south of the Fort Collins field, Larimer County, Colorado, swabbed 60 barrels of oil with 3 barrels of water the first 24 hours from 5944-6000 feet after shooting with 142 quarts of nitroglycerine. Total depth of the well 6028 feet, plugged back depth 6000 feet. Galvin 1 is ¼ mile south of the discovery well completed in March

Cooper Cove: Stanolind Oil & Gas Company cemented 6⅝-inch production string at 4853 feet preparatory to testing production in Johnson- Parkinson 1, SE NE SW 20-18n-77w, Cooper

Wells Completed in the United States in Week Ended May 6, 1944

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†Input	Dry	Total	Old Wells Deepened	WILDCAT COMPLETIONS *Oil	Gas	Dry	Total	ALL COMPLETIONS This Week	Last Week	Cumulative This Year	Cumulative Last Year
Alabama	....	....	....	....	....	....	....	....	....	....	....	1	6	.....
Arizona	....	....	....	....	....	....	....	....	....	....	....	....	3	....
Arkansas	2	....	....	1	3	....	....	....	1	1	4	10	67	84
California	32	....	....	....	32	3	1	....	5	6	41	41	692	431
Colorado	....	....	....	....	....	....	....	....	....	....	....	....	9	8
Georgia	....	....	....	....	....	....	....	....	....	....	....	....	1	1
Illinois	....	....	....	....	....	....	....	....	....	....	....	21	503	623
Indiana	....	....	....	....	....	....	....	....	....	....	....	7	95	90
Iowa	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Kansas	8	3	1	7	19	....	1	....	8	9	28	49	612	519
Kentucky	....	....	....	....	....	....	....	....	....	....	....	9	223	92
Louisiana	6	....	1	1	8	....	1	....	5	6	14	11	225	181
North Louisiana	5	....	1	1	7	....	....	....	3	3	10	2	74	73
South Louisiana	1	....	....	....	1	....	1	....	2	3	4	9	151	108
Michigan	....	....	....	....	....	....	....	....	....	....	....	11	185	157
Mississippi	....	....	....	....	....	....	....	....	....	....	....	2	36	26
Missouri	....	....	....	....	....	....	....	....	....	....	....	....	6	4
Montana	5	....	1	....	6	....	....	....	1	1	7	6	92	61
Nebraska	....	....	....	....	....	....	....	....	....	....	....	....	7	18
New Mexico	6	....	....	....	6	....	....	....	1	1	7	6	142	89
New York	15	....	10	4	29	....	....	....	....	....	29	25	425	383
Ohio	3	2	....	3	8	....	....	....	....	....	8	4	276	297
Oklahoma	20	3	2	6	31	....	1	....	8	9	40	37	534	464
Pennsylvania	26	7	15	....	48	....	....	....	....	....	48	47	948	828
Tennessee	....	....	....	....	....	....	....	....	....	....	....	....	5	2
Texas	75	3	1	10	89	4	5	2	19	26	119	114	1,910	1,177
E.Tex.Bor. Co.'s	....	....	....	....	....	....	....	....	....	....	....	....	4	6
E. Texas Field	....	....	....	....	....	....	....	....	....	....	....	2	3	2
Rest of E. Texas	....	2	....	....	2	....	1	....	3	4	6	4	101	73
North Texas	12	....	1	1	14	1	....	....	6	6	21	22	435	296
W. Central Tex.	....	....	....	3	3	....	....	....	1	1	4	11	131	110
West Texas	38	....	....	2	40	....	2	....	1	3	43	34	534	297
Tex. Panhandle	2	....	....	....	2	....	....	....	1	1	3	7	70	77
G. Coast, Upper	7	....	....	3	10	2	1	....	1	2	14	11	175	84
G. Coast, Lower	11	1	....	....	12	1	....	1	1	2	15	19	294	190
Southwest Texas	5	....	....	1	6	....	1	....	5	6	12	4	133	116
S. Central Tex.	....	....	....	....	....	....	....	1	....	1	1	....	30	26
West Virginia	3	14	....	2	19	....	....	....	....	....	19	18	324	206
Wyoming	3	....	....	....	3	....	....	....	....	....	3	2	55	41
Total U.S.	204	32	31	34	301	7	9	2	48	59	367	421	7,381	5,784

* Includes distillate wells. † Includes salt water disposal wells.

Cove structure, Carbon County, Wyoming. It yielded 3500 feet of oil on drill-stem test in Dakota sand at 4868-93 feet, found the Sundance at 5280-5304 feet water bearing and after drilling to 5373 feet plugged back to 4912 feet. The company has location for Union Pacific 1, NE SE NE 19-18n-77w.

Ingomar Dome Test: Northern Ordnance, Inc.'s N.P.R.R. 1, C NE SW 27-9n-35e, 1¾ miles southwest of Hillison 1, gas discovery on Ingomar Dome in Rosebud County, Montana, which gauged 8,200,000 cubic feet of gas in Amsden sand at 3910-4030 feet, was abandoned in Madison lime at 5907 feet. It had top of the Sunburst sand at 3390 feet, top of the Amsden at 3914 feet with a flow of nitrogen gas at 3920-4012 feet, but encountered water at 3956 feet.

Illinois

Pine Prairie Field Given Slight Extension

The Belle Prairie field was given a slight extension with McClosky lime production at Shell Oil Company's Shepard 1, SW SE 2-4s-6e, Hamilton County, when it swabbed 90 barrels of oil and 35 barrels of water in 21 hours, while cleaning out at 3432 feet.

White County: Sun Oil Company's Renshaw 2, NW SW SW 18-4s-14w, northeast of Crossville, is pumping 553 barrels of oil daily from the Degonia lime. Plug was drilled at 2004 feet with total depth 2037 feet.

Jasper County: Kingwood Oil Company's Flinn 1, NW NW NW 8-6n-8e, a wildcat 2½ miles northeast of the village of Wintrowd, is drilling below 2200 feet. The well is about 7 miles west of Newton.

Madison County: Harry Hubbard's Kolb 1, SE SW SW 9-4n-6w, in the Marine pool, has been on production test several days. It has been yielding 30 barrels on pump each 24 hours from Devonian lime at 1748-51 feet.

Effingham County: Homer Luttrell has abandoned Curry 1, NE NE NW 25-7n-5e. Hole was drilled to 2560 feet, through the McClosky lime, without a trace of oil found.

Gulf Refining Company's Kluthe 2, NW SW SE 33-6n-7e, has been completed for 28 barrels daily on pump from Cypress sand at 2513-21 feet.

Montgomery County: The Texas Company's Marine State Bank 1, NE NE SE 32-10n-3w, a wildcat test, tested 2 gallons of brackish water and 1½ gallons of oil per hour after the hole had been deepened to 2952 feet in Trenton lime. The well showed about 8 quarts of oil per hour in the lime at 2641-2714 feet.

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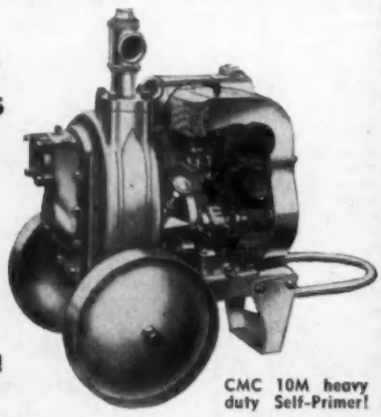

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Kansas

Interesting Wildcat Showings Being Tested

While no new discoveries were reported in Kansas this week several interesting wildcats are being watched as good oil shows were logged and preparations are going ahead to test. Meanwhile, exploration work continues with Cities Service Oil Company doing seismic work in Township 25-15w, Stafford County, Skelly Oil Company moving in a core drill in Franklin County to work in Township 18-18e and also doing seismic work in Morris County in Township 14, Ranges 6-7 east.

Barton County: Two miles west of the Hess pool, The Texas Company's Pritchard 1, NE NE SE 34-20s-14w, recovered 600 feet of oil- and gas-cut mud on drill-stem test from 3280-95 feet. Lansing was topped at 3275 feet and cored from 3285-3291 feet.

Casing is being run in Royer & Farris Murdy 1, NE NE NE 8-18s-14w, wildcat two miles southwest of the Boyd pool, after recovering saturated core from Lansing-Kansas City lime topped at 3242 feet and cored at 3324-26 feet. Spotted porosity was reported in core from 3336-42 feet. Top of Sooey sand, 3460 feet, top of Arbuckle 3496 feet; total depth 3504 feet.

Pratt County: Lion Oil Refining Company, which recently discovered a major pool 15 miles southwest of Chitwood, is rigging Andrews 2, SE SW SE 24-19s-14w, west offset to Andrews 1, discovery well which has been given a flowing potential of 731 barrels of oil daily through ½-inch choke. The well is producing from Simpson sand at 4395-4403 feet. The company also has staked Allen 1, SE NE SE 25-19s-14w, a south offset to the discovery well.

Barber County: Phillips Petroleum Company has set pipe at 4603 feet to test a gas show in Marjorie 1, C NW SW 31-30s-13w, 2½ miles northwest of Lake City pool. Total depth is 4775 feet and a drill-stem test in the Viola at 4509-13 feet recovered 3 million feet of gas.

Graham County: After reporting oil shows in the Lansing at 3479 feet, Con-

tinental Oil Company has abandoned Hinman 1, NW SE SW 23-9s-12w. Test of the interval proved dry. Arbuckle was topped at 3809 feet. The test is near the Morel pool.

Ellsworth County: Cities Service Oil Company is rigging up for a test at Vacek 1, NE NE SE 35-15s-10w, wildcat a mile north of the Stoltenberg pool. Arbuckle was topped at 3315 feet and core from 3318-3322 feet, total depth, showed oil and good saturation.

Oklahoma

Garvin County Well Indicates Important Strike

With all indications of an important new oil strike, Ohio Oil Company was preparing to test McKinney 1, SE NE SE 18-3n-2e, Garvin County, which showed good for 20 barrels of 34-gravity oil per hour on drill-stem test from Pennsylvanian at 2864-89 feet, total depth. The discovery is in the East Pauls Valley area where so far attempts have yielded large gassers. The test is more than a mile west of Burns 1, gas well in Section 17. Sand in the Pennsylvanian was topped at 2866 feet and formations are running somewhat higher than a small well drilled by Kerlyn et al in Section 20.

Seminole County: Pipe is being run in Deep Rock Oil Corporation's Coffey 1, SW SE 17-8n-8e, north of the Wewoka pool which looks like another good Misener sand producer for the area. Pay was topped at 3904 feet and saturated core was recovered from 3905-3907½ feet.

Cities Service Oil Company has set pipe and is preparing to test a show in the Booch sand cored at 2682-2701 feet in Dalton 1, SW NE SE 5-7n-10e, while Newt Barrett's Baker 1, NE NW SE 29-10n-6e, wildcat west of Seminole, is shut down for repairs at 4307 feet.

West Edmond Pool: Sohio Petroleum Company extended the field 3 miles north when Wiliams 1-B, C SE SW 7-14n-4w, Oklahoma County, was completed flowing 121 barrels of oil per hour and later pinched back to the field's allowable. Casing was perforated from 6922-75 feet, and from 6958-75. Showing oil it was acidized with 1000 gallons.

Gulf Oil Corporation entered the West Edmond play, staking Messenbaugh 1, C SW SE 20-14n-4w, while 5 miles south of production Denver Producing & Refining Company's Bailey 1, C SW SE 19-13n-4w, was drilling below 7200 feet after reporting top of Mississippian at 7140 feet.

North of the field Phillips Petroleum Company announced 2 locations in Oklahoma County, Edmond 1, C SW SE 6-14n-4w, and Rodkey 1, C NW SE 8-14n-4w. Anderson-Prichard Oil Company is also figuring in the north extension play with Mosier 1, C SW NE 7-14n-4w, and Cypher 2, C SW SW 17, and Cypher 1, C SW SW 18-14n-4w. Mid-Continent Petroleum Corporation staked Lynch 1, C NE NW 18-14n-4w, south offset to Sohio Producing Company's Williams 1-B completion.

Washita County: Gulf Oil Corporation was erecting storage and preparing to perforate in the second granite wash zone in Hare 1, SE NE SE 8-8n-20w. This is the second well to reach the conglomerate in the West Sentinel pool. The upper wash was topped at 5565 feet and showed oil in cores. Perforations in the second zone are to be made at 6262-6435 feet.

McClain County: Carter Oil Company's deep Anadarko Basin discovery, Cottingham 1, C SE SW 4-7n-3w, is down with a fishing job. The well originally flowed 1215 barrels of oil in 35 hours on initial test with 20 percent water. Perforations at 10,625-50 were squeezed twice, water content decreasing after each test. With packer set at 10,527 feet pool was opened and blew air for 10 minutes. When tool was pulled packer was left in the hole. Tools are being moved from Johnson Ranch 1, dry hole northwest Cottingham 1, to Lamar Ranch 1, C NE SW 28-8n-5w.

Cleveland County: Perrine et al's Loveless 1, NW NE 14-7n-1w, wildcat near Noble, was abandoned at 7244 feet after recovering white, salty sand in the Wilcox topped at 7227 feet. It had the Viola at 6830 feet, cored from 7216-27 feet, recovering dry sandy dolomite.

Oklahoma Produces Over March Allocation

Oklahoma producers exceeded the state allocation for March, producing 329,730 barrels of oil a day during that month, or 2730 barrels daily over the allocation, the conservation department's monthly report shows.

Prorated pools averaged 138,641 barrels, an underproduction of 4259 barrels, and unclassified fields produced 191,089 barrels daily to exceed assigned production by 6989 barrels.

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West Texas

Gaines County Wildcat Failure in Ellenburger

Continental Oil Company's Jones 1-A, northwestern Gaines County wildcat, was eliminated as an Ellenburger producing prospect in failing to show oil or gas from perforating at 11,850-11,950 feet. Previous perforations at 12,120-12,219 feet yielded 11,000 feet of water. Tests will be made of nominal porosity passed up in the Pennsylvania and Basal Permian.

Stanolind Oil & Gas Company's Riley 1, 8 miles west by south of the Cedar Lake field entered Yates zone at 3200 feet with gas showing in drilling broken sand to 3460 feet, where drill-stem test is pending. Humble Oil & Refining Company's Doss 1, Clear Fork project, cemented protection string of 9-inch at 4257 feet, and Shell Oil Company's Sparks 1 was drilling at 3985 feet with the same objective.

Crane County: The Texas Company's Hobbs-Shell 1, which fulfilled depth contract in dry Simpson at 5815-6021 feet, will be plugged back to perforate about 100 feet of effective Devonion pay entered near the 5240-foot level after testing a nominal show of oil following acid treatment of Silurian perforations at 5670-85 feet. Dennis and Fitzgerald et al's McPherson 1, 4½ miles west by north of the above prospect and on a separate geological trend, entered Simpson at 4920 feet and Ellenburger at 5788 feet with an abundance of water at 5046 feet.

Winkler County: Gulf Oil Corporation's Keystone 46-E, mile southeast of discovery for Ellenburger sector of the Keystone field and 2 miles from the most western deep producer, rated at 9,483,000 feet of gas daily with 20 barrels of distillate being produced during last half of one-hour drill-stem test at 9250-9367 feet. Drill-stem test of the Ellenburger section at 9367-9477 feet showed gas at rate of 8,297,000 feet daily with about the same volume of distillate. This outpost is only 17 feet low to the discovery which logged 307 feet of similar gas cap before reaching oil. Richardson & Bass' Walton 10-3, highest on structure, flowed 2227 barrels of 43-gravity oil, gas-oil ratio 1591/1, on natural potential test through ½-inch from casing perforations at 9600-65 feet and open hole from 9675 to 9858 feet. The gas cap was entered at 9103 feet, and first oil at 9510 feet, with broken oil pay continuing to top of granite wash at 9850 feet. This is a record producing section for Ellenburger, while no water was found in drilling to granite. Information gained from this well will induce operators to standardize on 7-inch oil string instead of 5½-inch in order to take in the entire oil pay after casing off the gas-cap.

Deep Tests: Sinclair Prairie Oil Company's Grisham-Hunter 1, Andrews County prospect, developed a fishing job after unsuccessful drill-stem test at 11,226 feet in Ellenburger, topped at 11,191 feet with elevation of 3242 feet. Top of Montoya was called at 10,180 feet and Simpson at 10,455 feet, giving the area 3 zones of Ordovician. The company's Campbel 1, Winkler County wildcat, was drilling shale at 11,246 feet in Simpson, topped at 10,895 feet. Humble Oil & Refining Company's Carter 1, Deep Rock field, Andrews County was drilling lime at 11,720 feet, and its Scarborough 1, Western Andrews County, drilling shale at 10,180 feet. Shell Oil Company's Cox 1, 4 miles northwest of Union field, drilling lime 9760 feet.

Pecos County: Electrical formation survey indicates possible production in the Ellenburger at 15,075-15,270 feet for Phillips Petroleum Company's Ada Price 1, which has been idle for some weeks pending delivery of 5½-inch pipe. Magnolia Petroleum Company et al's Lemar 1-A, south offset to the dormant Owego pool discovery, failed to reach water in coring to 4275 feet in Ellenburger, topped at 4258 feet, or 246 feet low. Shell Oil Company's Cordova-Union (Atlantic) 1, east offset to the discovery, was showing a small volume of oil and water after multi-stage treatment with acid through perforations at 4006-41 feet in Ellenburger, topped at 4005 feet.

Fullerton Field: Magnolia Petroleum Company's Bitler-Lowe 2-A, prospective mile northeast extension, was drilling at 6450 feet, having logged San Andres at 4530 feet, or 23 feet low. Anderson-Prichard Oil Corporation's McCrea 1, mile west extension, showed for a small well after acidizing upper pay at 6829-6900 feet, and was coring 7010 feet.

North Texas

Clay County Strike Three Miles West of Haskell

An oil discovery in Clay County; four potential strikes in Archer, Wichita and Wilbarger Counties; and major extensions in Jack and Montague Counties emphasizes the volume of prospecting underway in the district. Wildcatting accounts for a substantial portion of the drilling, and is widely scattered. D. H. Bolin and associates announced eight shallow wildcats for Archer County within the past two weeks.

Clay County: Bridwell Oil Company's J. S. Bridwell River Ranch 2, Block 27, Word & Halsell Subdivision and 3 miles west by south of the Halsell multi-pay field, scored a discovery in recovering 3000 feet of oil and 100 feet of salt water, with 1900 pounds bottom-hole pressure, when tester was used in broken Strawn pay at 4745-70 feet. The appearance of water confirmed the core record, which indicated that the last foot carried water. A previous test by the company on its 2000-acre lease and in Archer County almost qualified as a producer from the same level.

Archer County: British-American Oil Producing Company's George 1-B, 3 miles southwest of Dundee, cemented 4½-inch pipe at 3130 feet after recovering 15 feet of oil-cut mud, with 1200 pounds bottom-hole pressure, when tester was used in Palo Pinto lime at 3131-36 feet. Top of Canyon was called at 2580 feet. The company has been successful in developing production under similar conditions to the southwest in Baylor County. Shell Oil Company's Robertson 1, J. Dorsey Survey, landed 4½-inch pipe at 3252 feet on top of a 7-foot Strawn saturation to try for completion after failing in Ellenburger at 5462-5661 feet.

Wilbarger County: Humble Oil & Refining Company's McDaniel 1, C NE NE H&TC 56, Block 15, and ¾-mile southwest of its failure in Ellenburger at 6430-49 feet, was drilling shale at 5475 feet after testing 65 feet of oil and 190 feet of oil-cut mud from conglomerate pay at 5034-57 feet. This zone was not among the numerous shows logged by the first project.

Jack County: Hanlon & Buchanan's Ellis-DuBose 1-E, northwest corner Block 4, J. W. Williams Survey, and a mile southwest of Ellis pool, made steady flow of oil into pits while cleaning itself following 3000-gallons treatment of saturation at 4700-23 feet in Bend, topped at 4696 feet. Top of Bend is 83 feet high to nearest lime producer, and intermediate acreage has not been explored for deep production. O. J. Perrin et al's King 1, J. S. Henderson Survey, northwest extension for Ellis pool, is rated at 60 barrels daily after using 1000 gallons of acid through perforations at 4718-27 feet, possibly involving new pay. Shell Oil Company's Lester 1-B, McKinney & Williams Survey A-435 and north offset to its prolific Mississippian discovery for the Lester area, was drilling 5715 feet in Ellenburger, topped at 5694 feet. This test proved dry in Mississippian entered at 5547 feet, 160 feet low.

Wichita County: Panhandle Refining Company's Madden 1, Block 8, Wm. Mayer Survey and 3 miles southwest of the West pool, found Ellenburger dry at 5300-51 feet, then landed 5½-inch at 5225 feet to perforate broken saturation in conglomerate at 5133-78 feet, which was also present in a recent failure ¾-mile to the northeast.

Cooke County: Sinclair Prairie Oil Company's Cory 1, offset to its Montgomery pool discovery, tested water from perforations at 5394-5404 feet after drilling to water in Ellenburger at 6223 feet. It will be tested at higher level. Magnolia Petroleum Company's Long 1, north offset to the producer, entered Simpson at 5656 feet, and landed 7-inch on bottom at 5988 feet. Test at 5835-5912 feet indicated oil production. Northern Ordnance has landed pipe for completion of four tests near its Strawn discovery for the Woodbine area, where the company has scheduled more than a score of field tests and wildcats. This multi-pay area is likely to become the most active in the district, displacing the Hildreth field.

Montague County: McGuire Industries, successors to Auto Ordnance, et al's Whaley 1, NWc BBB&C Section 16, extended the Dodson, or East Nocona pool, ¾-mile northeast in testing 4655 feet of oil on drill-stem test at 5197-5209 feet. Pipe was cemented on top of this conglomerate pay in Bend, topped at 5147 feet.

E. C. Rach Joins Byram as Consultant

R. W. Byram & Company, Austin, Texas, announces appointment of Ed C. Rach, as consultant. He is a petroleum engineer and geologist, and for the past two years has been with the War Production Board as an industrial specialist.

E. C. Rach

During the course of his career Rach has worked in Oklahoma, Arkansas, Texas, and Venezuela. He will be engaged in a general consulting practice.

Southwest Texas

La Rosa Field Well Makes 243 Barrels

Activity was a little below par this week, due to bad weather, though an unusual amount of drilling was in progress in certain sections. Production in proven fields of Starr County was high. Biggest of the new wells was Baldridge, King & Nichols' Vela 1, in La Rosa field, which gauged 243 barrels daily on 3/16-inch tubing choke through perforations at 2478-96 feet. At Cameron field, Continental Oil Company brought in W. I. Cameron 6 for 141 barrels daily on a 24/64-inch choke through perforations at 4130-32½ feet. Standard Oil Company of Texas' Casey 5, in Sejita field, was finaled for 137 barrels per day on 1/8-inch at 5840 feet. Ross pool obtained a new producer with completion of W. L. Goldston's Kelsey 2. The well was bottomed at 2700 feet, and made 118 barrels of 27-gravity oil from 2497-2507 feet. A good producer came in at North Sun field when Sun Oil Company's Felipe Olivares 4, completed for a potential of 109 barrels in 12 hours on a 9/64-inch choke in sand bottomed at 4544 feet.

Willacy County: Willamar field had 3 new producers and 8 new tests. A wildcat failure was reported by The Texas Company whose Yturria 3, Share 58, San Juan de Carricitos grant, north of Raymondville, was plugged at 10,585 feet. Drillers were unable to sidetrack around a core barrel and lost drill stem. A new location for the immediate area is expected. Sun Oil Company's Santa Rosa 1, Share 44, same grant, 8 miles southeast of Raymondville, ran electric log to 9430 feet. Humble Oil & Refining Company's Sauz Ranch 1, Share 64, is preparing to run drill-stem test at 7979 feet in shale.

Karnes County: Wildcatting was active in this sector, especially near the new Runge field, where Phillips Petroleum Company was testing Wilbern 1, east offset to the discovery well. The test recorded 265 feet of fluid, 198 barrels of which was oil. Arkansas Fuel Oil Company's Lyons B-1, a west offset was also testing about 6 barrels hourly at 6579-87 feet when it squeezed off. Magnolia Petroleum Company's Russell-Atkinson 1, Carlos Martinez grant, 3 miles east of Green, ran a drill-stem test at 6538-43 feet on ¼-inch chokes and recovered 600 feet of oil, 50 feet oil and mud, 10 feet of water, with total depth at 6543 feet. The well is now waiting on cement. Amerada Petroleum Corporation was drilling at 8567 feet in Wood 1, Maria de Jesus Yarbo grant, 2½ miles southwest of the Slick-Wilcox field.

Jim Hogg County: The Texas Company's E. L. Armstrong B-4, in the Armstrong pool had an initial of 198 barrels 35.7-gravity oil through ¼-inch choke. Total depth was 3680 feet. Operators were rigging up for Armstrong 5 in the same pool.

Sun Oil Company reported a failure in the East field at 4850 feet. Arkansas Fuel Oil Company's Spoontz, section 21, abandoned at 5015 feet.

Goliad County: Continental Oil Company was running new tests at Reed 1, wildcat in S. Vela survey, 10 miles northwest of Goliad. The original perforations at 8730-36 feet were squeezed and pipe will be reperforated at 8574-88 feet after completing repairs. Netherland Cab Company's Fromme 1, T. Handcock survey, was drilling below 8200 feet, with correlation log reporting formations high. H. H. Coffield, J. W. Frazier and R. N. Ranger's Chilton 1, J. F. Payne survey, 5 miles southeast of Slick-Wilcox field, was reported making 3 barrels of condensate per hour on 1/8-inch choke from new perforations at 7980-85 feet. Original perforations were squeezed when water broke in at 7987 feet.

Duval County: Gorman-Bridewell Oil Company's W. K. Hoffman B-1, survey 116, was plugged at 3364 feet. Magnolia abandoned Duval County Ranch Company 1, survey 80, 5 miles northwest of Freer, at 4060 feet. H. J. Porter et al's W. W. McCampbell 1, survey 12, 2½ miles west of Fitzsimmons field, was abandoned at 4000 feet.

East Texas

Oak Grove Area Has Prospects in Sub-Clarksville

Oil production from the sub-Clarksville sand is in prospect for the Oak Grove area, Wood County, through F. R. Jackson-Fisher & Fields' McCarley 1-B having logged 13 feet of porous oil-saturated sand in coring to 5011 feet. A drill-stem test is pending, but the test will continue to the 5400-foot Woodbine sand before running pipe. Base of Austin chalk was called at 4880 feet. McCarley 1-B is 1700 feet southeast of the partnership's Woodbine discovery, which is inactive because of the oil solidifying when exposed to surface temperature.

Wildcat Failures: Mid-Continent Pe-

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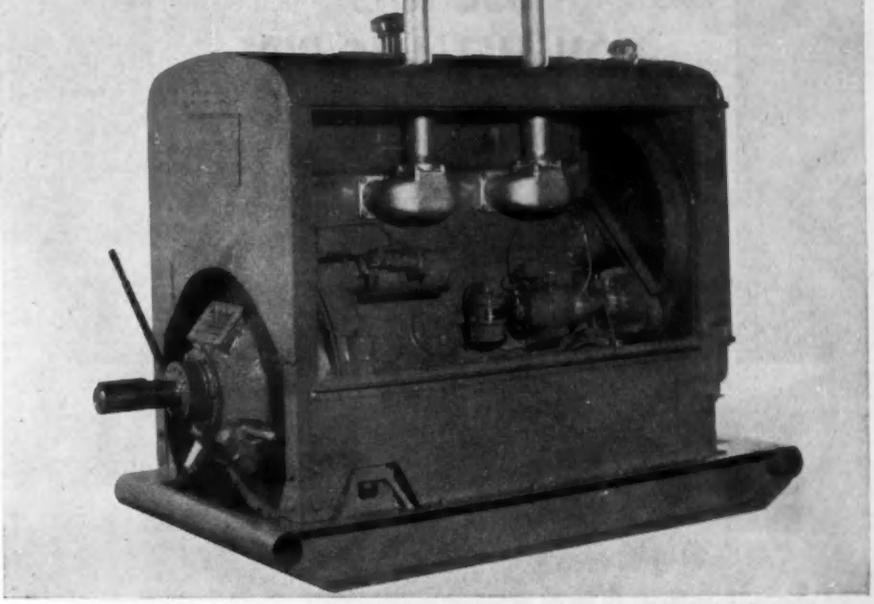

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troleum Corporation's McGahee 1, Camp County, was awaiting orders after finding the Travis Peak barren in drilling to 8352 feet. In Henderson County, Delta Drilling Company's Pecan Nursery 1 was running electrical formation survey at 10,689 feet, having proved dry in Travis Peak, topped at 10,505 feet. Hollandsworth Drilling Company and Stanolind Oil & Gas Company's Kimbell 1, Paluxy project for Hunt County, halted at 4880 feet.

Van Zandt County: The Texas Company's Easley 1 was drilling lime at 5620 feet, having entered the Georgetown at 5185 feet. Humble Oil & Refining Company's Surratt 1, Edgewood area, topped the Georgetown at 5025 feet and was drilling lime at 5100 feet. Both are slated to drill the Travis Peak.

Limestone County: Zephyr Oil Company's Nussbaum-Scharff 1, S. H. Bates Survey, established first deep production for the old Groesbeck shallow gas field in pumping 39.44 barrels of 41.4-gravity oil and 24.36 barrels of salt water initial after using 2000 gallons of acid through perforations at 4734-88 feet. This original deep prospect for the area explored the Pettit without results to 5515 feet, and gained production from oolitic lime beds between massive and basal anhydrite zones. The Opelika deep area, Henderson County, discovery oil well also produced from about same gelogical zone, but depleted and abandoned last year. Zephyr Oil Company's Richardson 1, 1500 feet northwest of its new pay discovery, was drilling below surface pipe. This stray oil zone may have been the source of the production of the short-lived gusher that opened the Kosse area to the southwest.

Smith County: The Paluxy oil horizon is proving erratic in the Sand Flat pool, and it is now evident that the area will not get the active drilling program anticipated. Arkansas Fuel Oil Company's Marsh 2, location east by north of its pumper, entered Paluxy series at 7116 feet, 58 feet low, and was awaiting orders at 7215 feet. A comparatively thin oil zone overlying a water sand is doubtful of commercial production. Humble Oil & Refining Company's Shamburger 1, nearly a mile southeast of production, missed the Paluxy pay, and was drilling at 7510 feet to explore the Rodessa. Sun Oil Company's Patterson 1, west outpost and Paluxy failure, will set pump to try for completion in Rodessa at 9342-54 feet with column of water standing 3000 feet from surface.

Camp County: Magnolia Petroleum Company's Florence 1, offsetting 7900-foot production in the Pittsburg field, logged oil-saturated sand in sub-Clarksville at 3842-48 feet, and 1-hour drill-stem test yielded 300 fet of low-gravity oil, 300 feet of oil-cut mud and 300 feet of salt water. This is the first indication that a shallower pay may be developed in the area, but will be passed up to complete in the regular pay.

Panola County: Carthage area will get extensive exploratory activity with Humble Oil & Refining Company. The company is examining title to a block south and southwest of Carthage, with plans for a 9000-foot hole in the area now being tested by Arkansas-Louisiana Gas Company's Pirkle 1, Shields survey, five miles southwest of Carthage. The Pirkle test is below 6500 and has indicated gas-distillate in both upper and lower Pettit.

W. C. Feazel and N. V. Kinsey, whose Ross 1, Moorman survey, is being dually completed as a gas-distillate well from lower Pettit and Travis Peak at 6480 feet, extending the Carthage field 3 miles west, are drafting a 4- or 5-well program.

Rogers Lacy's Cameron 1, Lagrone survey, the county's first deep oil producer, was swabbing after perforating the lower Pettit to obtain gas as a lift for the oil coming from the Travis Peak. Depth is 6634 feet. The well went dead after flowing by heads. Lacy's Cook 1, 2 miles north on north flank of the Carthage wet-gas area, has gas line laid and is rigging up.

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Texas Gulf Coast

Wildcat Work Continues Despite Adverse Weather

A week of heavy rains held up tests on many wildcats that held possibilities of extending productive fields. New tests that should have gotten under way this week were postponed, but despite the weather most wildcats reported new hole.

Possible west extension to the Joyce Richardson area in Harris County is expected as General Crude Oil Company made tests this week of Vinnie Rorick 1, Lot 22 J. C. Ogburn survey. The well was drilled to 7602 feet, with 5½-inch casing set near bottom, swabbed and got no shows. Pipe has been reperforated with 24 shots at 7137-41 feet and is now running tubing and preparing to swab. An offset to the north has

been staked by Lenoir M. Josey, Fee 2. It will be drilled to 7500 feet in expectation that sand in the General Crude Oil Company well is above the 7500-foot level.

Wynn Crosby Drilling Company and Providence Oil Company abandoned Bassett Blakely 1, 5 miles northwest of Clodine, after no shows, at 8015 feet.

Matagorda County: Ohio Oil Company's Account 3 (McDonald 1), an extension test 1 mile north of North Bay City pool production, was drilling in shale at 8740 feet.

On the west side of the North Bay City pool Sun Oil Company completed Braman B-2 for potential of 40 barrels daily on ⅛-inch choke from perforations at 8400-02 feet, total depth of 8801 feet.

Ohio Oil Company's Hefflefinger & Hermanson 1, wildcat 4 miles northeast of Blessing in P. Burnett survey, was drilling at 7730 feet in sidetracked hole. This test may open new production for the section.

Skelly Oil Company's O. E. Norris 1, Frio test 4½ miles north of Bay City, was drilling at 8427 feet.

Chambers County: Most active wildcatting of the district was taking place in this area. Five locations were staked this week, one of which was Sun Oil Company's Ole Eng 2 in the Seabreeze area, where the company is drilling Thompson 1 at 9929 feet. The new test is projected to 9750 feet.

Sun Oil Company's discovery wildcat Daugherty 1, north of Winnie, made an initial potential of 154 barrels of 36.3-gravity oil through ⅛-inch choke, with casing sealed and 2300 pounds tubing pressue. Bottom of hole is at 9519 feet, with perforations at 8757-59 feet.

The Stowell area was receiving attention as Gulf Oil Corporation located Ogilvie 1 on a 40-acre lease, Lots 59 and 60, F. Valmore League. Contract depth is 8000 feet. The well is 900 feet northwest of Sun Oil Company's Green 1, dual-sand producer, northwest outpost of the field. Potential on Green 1 was 359 barrels from A sand topped at 7624 feet, and 362 barrels daily from B sand perforated 7710-32 feet.

The Texas Company dual completed Federal-Jenkins Unit 1, Block 10, Stowell field, for 378 barrels from lower sand at 7630-40 feet and 348 barrels from upper sand perforated at 7580-90 feet.

Liberty County: Shallower production for the Kirby field was opened with completion of General Crude Oil Company's Garbs 1, M. Duncan survey, on the north edge of the field. The well was perforated with 300 shots at 5960-6010 feet for a potential of 150 barrels daily through ⅛-inch choke. Total depth of hole was 6693 feet. The company has made location for three tests in the field, all on a 956-acre lease in the M. Duncan survey.

Humble Oil & Refining Company's Boyt B-1, Double Gum Bayou area, was below 4100 feet in sand and shale. Gulf Oil Corporation's Kirby C-22, J. Pleasants survey A-327, deep test at the Cleveland field, 4100 feet southwest of Kirby 14, nearest well, was drilling in shale at 4099 feet.

Washington County: Magnolia Petroleum Company staked the Lauter 1, in the Clay Creek pool, contracted for 12,000 feet.

Fort Bend County: Gulf Oil Corporation and Humble Oil & Refining Company plan to drill Scanlan 8 on the east side of Thompson field, scheduled for 12,000 feet.

Wilcox Tests: In Polk County where search for Wilcox production got under way with production at Livingston, Humble Oil & Refining Company abandoned Granbury 31, A. Viesca League. The well cut a fault, drilled to 7451 feet without finding commercial shows, plugged back and tested the Sparta, which also failed to show commercially.

In Newton County, Gulf Oil Corporation's Kirby A-1, wildcat in B. Simmons survey, 2½ miles south of Call, was abandoned at 10,500 feet. It topped Wilcox at 9100 feet.

Another Wilcox test was contracted for Colorado County as Tide Water Associated Oil Company staked Underwood 1 on a 218.89-acre lease, M. Muldoon survey, 3 miles northeast of Sheridan, to go to 11,000 feet.

South Louisiana

Delarge Well Plugs Back; Still at Record Depth

Union Producing Company and Fohs Oil Company last week still were working to shut off salt water coming in with oil from around 13,588 feet at Buckley-Bourge 2, 1-20s-16e, Delarge area. After several squeeze jobs failed, the hole was plugged back to 13,542 feet, and the test is now waiting on cement. Successful production at this depth would break the depth record achieved by the same operators in this area at Fitzpatrick-Vizard 1 last year,

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which flowed commercially from perforations at 13,475-90 feet.

St. Martin Parish: Gulf Refining Company completed Iowa-St. Martin Land Company 1, 21-9s-7e, flowing 211 barrels of 30.5-gravity oil on 5/32-inch choke. Four shots per foot were made in perforations at 11,050-74 feet and 11,082-88 feet. The well will be reworked, however, in an attempt to increase oil flow. Gas-condensate wells are located in shallower formations higher up on the Section 28 Dome, and this strike seems to have opened major oil production.

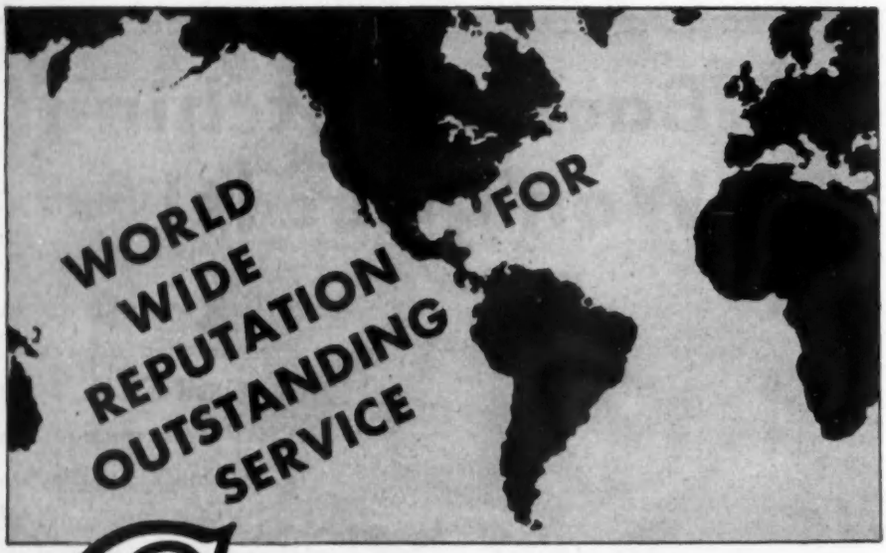
Kidder 1, Amerada Petroleum Corporation's third test in the Arnaudville area, 3050 feet east of the discovery well in Section 44-7s-5e, is drilling at 7800 feet in shale and lime.

Cameron Parish: Unusually active wildcatting was scheduled for this parish as Amerada Petroleum Corporation made location north of the West Hackberry pool for Glassell 1, Section 16-12s-10, which was planned to start immediately. Three other tests have been staked in previous weeks and will soon be under way.

Humble Oil & Refining Company's Cameron Parish School Board B-1, 16-14s-5w, Catfish Lake area, was drilling at 10,127 feet in sandy shale with streaks of hard sand. Superior Oil Company's Miami Corporation B-4, Section 19-14s-3w, near Pecan Lake, was drilling in shale with hard streaks at 9265 feet.

Evangeline Parish: Continental Oil Company's Quirk 1 has been completed for 439 barrels of 54-gravity oil on a ¼-inch choke. The well is between the Danciger et al and Humble-Continental producers in Reddell field, and went to 10,059 feet.

Calcasieu Parish: Continental Oil Company's Prairie Land and Canal Company 1, 2-11s-9w, a deep wildcat test in the East Moss Lake area, which flowed gas-distillate on tests, has been killed for rigging a heavier Christmas tree. Total depth is 11,319 feet.



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North Louisiana

Eleven New Producers Added During Week

North Louisiana last week saw the completion of 11 oil producers and 1 gas well completed for operational purposes. Two failures, a Union Parish wildcat, and a north offset to the discovery well in the Holly Ridge field of Tensas Parish were recorded.

Ben H. Gray's Arkansas Fuel Oil Company 20, 21, 22, 23, 24, 25, and 26, all 15-19-11, Bellevue shallow field of Bossier Parish were completed as small pumpers from 350 to 450 feet.

Sohio Oil Company's W. H. Farmer 5 and 6, 32-14-13, Holly field, DeSoto Parish, were completed at 2840, the first a small pumper, the latter flowing 150 barrels daily, making the best well in the field. Texas Mineral Land Companys' E. L. Scott 7, flowed 65 barrels daily from 2773-78 feet.

Two new wildcat locations, Dale W. Moore's Ruffin 1, SW SE SW 10-13-13, a 2900-foot test, and Phillips and Schoonmaker's Anthony A-1, NE 9-11-14, added to DeSoto Parish activities.

Bienville Parish: George H. Pierce and R. H. Crow Drilling Company are moving in rig on Arkansas Natural Gas Company's E. W. Merritt 1, NE SW, 13-17-7, which was drilled two years ago to 7600 feet. They will test the Nacatosh around 2000 feet and a gas level around 5700 feet.

Bossier Parish: Bellevue Producing Company's M. Moorey 2, SEc 22-19-11, has been spudded for a 3000-foot Travis Peak test in the Bellevue shallow field. It is an offset to Moorey 1, brought in last December gauging 12 barrels of 52-gravity oil hourly from Gloyd sand of Rodessa series of lower Glen Rose formation at 1807 feet. Moorey 1, shut in since completion, is being connected to Louisiana-Arkansas Gas Company gathering lines.

Tensas Parish: Union Producing Company's Penrod-Jorden 1-A, SW NW 20-11-10, Holly Ridge field, completed making 15 million gas from 3020 feet.

Carter Oil Company's Marks 1, NW NE 19-11-10, north offset to the discovery well of Holly Ridge field, abandoned at 8431 feet.

Union Parish: Sohio's Moore 1, wildcat in NW NE NE 2-22-2, abandoned at 7985 feet.

Interstate National announced a new drilling program for the Monroe field with locations for 6 wells, Fee 137, 138, 139, 140, 141 and 148 in Sections 3 and 34-19-3 and 15 and 34-20-3.

☆

J. C. WILLIAMSON, West Texas district geologist for Phillips Petroleum Company with headquarters at Midland, resigned to operate as a consultant, and is succeeded by Max W. David, who was with the company at Evansville, Indiana, since discharge from the Navy early this year.

Arkansas

Two Permits Granted In Rodessa Extension

First activity in the Rodessa extension area, Miller County, began last week with granting of drilling permits for two tests on units adjoining the 160 acres where the discovery well, N. H. Wheless' Wisinger 1, C NW SE 9-20-27, opened a gas-distillate pool last year. Wheless and Arkla Oil Company have staked White & Armstrong 1, SW SW 16-20-27; and B. D. Armstrong 1, SE SE 16-20-27.

Eight other permits were issued during the week for South Arkansas fields, 2 in Columbia County producing areas, 2 in the Stephens field of Quachita County and 1 in the Fouke field of Miller County.

Ouachita County: Davis Rubber Company's Farris 1, C SE NE 27-15-15, is fishing at 3963 feet after skidding over and beginning a new hole when the first hole was junked.

Florida

Three Wells Now Drilling in State

In addition to Humble Oil & Refining Company's Gulf Coast Realties 2, nearing completion depth in Collier County, Florida, Blanchard and associates' Everglades 1 was reported by the operator to be coring on April 28, at 8640 feet, in lower Cretaceous anhydrite and broken lime. A whipstock was set at 8595 feet to sidetrack a lost bit. The well is located near the Collier-Roe County line. Blanchard's-Buhler State Land 1 has been spudded in 25-55s-37e, Dade County, 15 miles southwest of Miami, and is drilling with cable tools.

Michigan

Allegan County Wildcat Flows 192 Barrels Initial

First promising shallow lime discovery for Southwestern Michigan in months, Cook & Fortneys' Beaver 1, SE SW NW 4-3n-12w, Allegan County, flowed 192 barrels after acid from Traverse limestone at 1576-78 feet. Lime top was 1576 feet with natural swab production of 15 barrels. This wildcat is located on a Sun Oil Company farmout, two miles northeast of West Hopkins field and two miles southeast of Dorr pool.

Isabella County: Cities Service Oil Company's Methner B-1, NW SE NW 33-16n-3w, South Wise field deep test, showed salt water in core at 5040-45 feet and drilling is going ahead at 5064 feet with Sylvania sand section the objective. The 5040-45-foot core was taken in Detroit River formation, potential producing zone. At present depth test is deepest drilled in the county.

Huron County: C. W. Teater's Moran 1, E½ SE NW 8-17n-14e, wildcat, flowed 20 barrels of oil from Traverse lime at 1482 feet and went dead. Later bailer tests showed salt water in bottom and well is now standing for orders. Top of Traverse was logged at 1420 feet.

It's About Time!

The Continental Bank & Trust Co. of N. Y. says there seems to be a tacit understanding between Congress and the White House: Congress to continue the Administration's powers; the Administration to hold the wage line at the Little Steel formula level. It's about time somebody held the line. Figures by the Department of Labor show that the average income of all factory workers increased 68.4 per cent from January, 1941, to October, 1943, a fat NET increase after income taxes and bond purchases were deducted. Of course comments like these sell no supplies and equipment, but business is too inarticulate. Inflation is an ugly thing. TRY PELCO FIRST—we aren't letting sentiment interfere with service.

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This is another of those features you *don't "see"* . . . but it performs an important service for you *on the job, on your equipment.*

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U. S. Exploratory Completions

ARKANSAS WILDCAT

Nevada County—Failure: Ryan Cons. Pet. Co.'s Minnie E. Laws 1, c se se 34-12s-23n, abnd 3445 ft.

CALIFORNIA WILDCATS

Kern County—Failures: Bandini Pet. Co.'s Bacon 1, 21, se se sw 21-28-20, S. Belridge area, abnd 1240 ft.

Continental's Easton 2, sw se 33-29-26, McClung area, 8-ft oil sand 7513-27 ft, gr sand 7540-92 ft, abnd 7750 ft.

Ohio's KCL J-1, ne se nw 6-31-26, Ten Sections area, Stevens sand barren, abnd 9313 ft.

Standard's 2-10, ne sw nw 17-29-29, North Edison area, abnd 1075 ft.

Texas Co.'s Bowerbank Unit II 8-B, c sw ne 8-29-24, Bowerbank area, rec mud and sw 4756-4800 ft, 3935-50 ft, abnd 4949 ft.

W. L. Adkisson's 5, (OWDD), 4-32-23, fr 3273 ft, abnd 3825 ft.

Orange County — Discovery: Barnsdall Oil Co.'s Sunny Hills Ranch 1, sw nw nw 22-3-10, between East Coyote and West Coyote, pump 135 bbls 24-gr oil, 33 wtr, 356 ft perf 6360 ft, td 6784 ft, pb 6355 ft.

KANSAS WILDCATS

Butler County—Failure: Adair & Morton's Kraft 1, ne ne sw 9-29s-7e, Topeka 1700 ft, Lans 2065 ft, Miss 2796 ft, Arb 3186 ft, abnd 3194 ft.

Leavenworth County—Failure: Miller et al's Schwarzer 1, c n nw se 21-9s-21e, Miss 1314 ft, abnd 1431 ft.

Marion County—Failure: Greenland's Stegeman 1, cw se nw 1-17s-2e, Hunt 2845 ft, Sylvan 2960 ft, Viola 3035 ft, abnd 3100 ft.

McPherson County — Failures: Plains Exploration et al's Baldwin 1, ne se se 26-18s-2w, Miss 2968 ft, abnd 3003 ft.

Allison et al's Rupp 1, swc nw 13-21s-2w, Miss 2960 ft, Misener 3330 ft, Hunton 3338 ft, Sylvan 3374 ft, Viola 3417 ft, abnd 3419 ft.

Meade County — Failure: Northern Ordnance's Isaacs 1, nwc 19-33s-27w, Winfield 2745 ft, Ft. Riley 2890 ft, Flo Flint 3000 ft, no Topeka, Lans 4555 ft, base K.C. 5240 ft, Chester 5936 ft, abnd 6265 ft.

Pratt County—Discovery: Lion's Andrews 1, sec 24-29s-14w, Doug 3786 ft, Viola 4359 ft, Simpson 4390 ft, Arb 4471 ft, td 4517 ft, perf 22 shots 4395-4403 ft, flow 1440 bbls, td 4517 ft.

Reno County—Failures: Vierson & Cochran's Miller 1, se nw ne 31-25s-9w, Arb 4310 ft, abnd 4360 ft.

Phillips' Wenzel 1, ne se sw 15-26s-5w, Arb 4124 ft, abnd 4138 ft.

KENTUCKY WILDCATS

Butler County—Failure: Frontier Fuel et al's Davis 1, 11-H-36, abnd 1542 ft.

Ohio County—Failure: Producers Pipe Line's Renfrow 1, 23-M-30, abnd 1485 ft.

Webster County — Failure: Cherry et al's Cates 1, 2-L-23, abnd 3350 ft.

NORTH LOUISIANA WILDCATS

West Carroll Parish — Failure: The California Co.'s S. C. Jackson 1, se ne 24-22-10, abnd 3357 ft.

Union Parish—Failure: Sohio Prod Co.'s Moore 1, nw ne ne 2-22-2, abnd 7985 ft.

NORTH LOUISIANA NEW PAY TEST

Caddo Parish—Rodessa Failure: Gulf Ref. Co.'s Campbell 1, 4-13-16, prod fr Gloyd zone Redessa series 6000 ft, pb to Hill sand, perf 48 shots 5794-5804 ft, 4000 gals acid, abnd.

SOUTH LOUISIANA WILDCAT

St. Mary Parish—Failure: Texas Co.'s State-Lse No 340 1, n 48° 10 mins w 13,510 fr USCGS Station "Bayou" well in W. Cote Blanche Bay T-16s-8e, abnd 11,516 ft.

SOUTH LOUISIANA OUTPOST

Lafourche Parish—Raceland Failure: Amerada's South Coast Corp. 14, start nwc 34-15s-19e, go 11,245.7 s 9115.8 e to lcn in 35-16s-19e, sw 10,803 ft, abnd 11,256 ft.

SOUTH LOUISIANA WILDCAT

St. Landry Parish—Cankton Discovery: Sun's E. M. Boagni B-1, 2356 s 2332 s 60° 35 mins e fr nwc 48-8s-4e, Discorbis 7140 ft, heterostegina 7530, Cibicides 8815 ft, perf 9667-90 ft, flow 470 bbls 38-gr, 9/64-in, td 10,512 ft, dotd, 9720 ft.

MONTANA WILDCAT

Rosebud County — Failure: Northern Ordnance's N.P.R.R. 1, c ne sw 27-9n-35e, Ingomar dome, Sunburst 3390 ft, Amsden 3914 ft, nitrogen gas 3920-4012 ft, water 3956 ft, abnd 5907 ft.

NEW MEXICO WILDCAT

Eddy County—Failure: Addison Oil Co.'s State 1, c ne sw 20-20s-28e, elev 3257 ft, abnd 1804 ft.

OKLAHOMA WILDCATS

Carter County—Failures: Boring's Nance 1, sw nw se 1-4s-3w, abnd 3000 ft.

Jones' Ford 1, ne sw 13-4s-3w, abnd 4460 ft.

Garvin County — Failure: Sinclair's Burke 1, ne nw sw 23-3n-1w, abnd 4688 ft.

McClain County—Failure: Carter's Johnson Ranch 1, c sw ne 13-8n-4w, Hunton 9500 ft, Simp 10,040 ft, abnd 10,536 ft.

Noble County—Failure: Deep Rock's Fehring 1, ne sw ne 7-21s-3e, Wood 4214 ft, Viola 4268 ft, Wx 4317 ft, 2nd Wx 4360 ft, abnd 4364 ft.

Okfuskee County — Failure: Texas Co.'s Keener 1, nw ne se 8-10n-10e, Mayes 3940 ft, abnd 4107 ft.

Pawnee County — Failure: Trigg et al's Ripley 1, ne ne nw 18-21n-4e, Miss 3890 ft, Wood 4120 ft, Wx 4177 ft, abnd 4201 ft.

Payne County—Discovery: Sunray's McKenzie 1, sw nw se 13-18n-3e, 2nd Wx 4135 ft, pb perf 2305-12 ft, flow 240 bbls.

Seminole County—Failure: McIntyre et al's Sawyer 1, se nw sw 12-6n-6e, Crom 2828 ft, abnd 2867 ft.

WEST CENTRAL TEXAS WILDCAT

Comanche County — Failure: Dave Montgomery et al's Moorman 1, 2833 ft nsl 2500 ft wel D&DA sur 37, A-1257, abnd 2760 ft.

WEST TEXAS OUTPOST

Andrews County — Fullerton Extension: Stanolind-Texaco's Logsdon 1, c se se PSL 5, blk A-32, 1⅛ mi nw prod, elev 3347 ft, San Andres 4390 ft, San Angelo 5580 ft, Clear Fork 6000 ft, flow 433 bbls, ¼-in, 16,000 gals acid Clear Fork (Wichita-Albany) 6829-7220 ft.

WEST TEXAS NEW PAY TESTS

Fisher County — Royston Failure: Condor Pet. Co.'s Steele 1, 150 ft nsl 330 ft ewl e½ of n½ sw¼ BBB&C Ry. sec 210, elev 1861 ft, DD fr 3210 ft, abnd in Ellenburger 5891 ft.

Howard County—Vincent Discovery: W. S. Guthrie and Cosden Pet. Corp.'s Allen 2, c nw se L. N. Ry. 57, blk 20, 1875 ft nw of 4000-ft pumper, elev 2359 ft, pump 36 bbls 33.6-gr, 8000 gals acid, shot 250 qts nitro 5451-5502 ft, td 6172 ft.

EAST TEXAS WILDCATS

Houston County—Failure: John S. Ivy and W. T. Moran's Murray 1, 10,000 ft wel 1980 ft nsl (river), John Durst sur, elev 165 ft, Midway 5050 ft, abnd 5500 ft.

Navarro County—Failure: John R. Bunn-Sohio's Cheney 1, 467 ft fr ne 6475 ft fr nwl, (w) John White sur, elev 370 ft, Austin chalk 2221 ft, hard chalk 2518-2696 ft, Woodbine 3053 ft, sand 3085 ft, abnd 3141 ft.

Upshur County—Failure: H. L. Hunt Oil Co.'s Tucker 1, 1400 ft fr m/s/s 660 ft fr m/e/wl, Chas. Duncombe sur, elev 417 ft, Pecan 2520-2790 ft, Austin 3755-3840 ft, Sub-Clarksville 3860 ft, Woodbine 4110 ft, Georgetown 4595 ft, Goodland 5675 ft, Paluxy series 5784 ft, water sand 5797 ft, abnd 6302 ft.

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WANTED: To contact responsible operator or company who would be interested in discussing the advisability of taking over for development some choice locations involving several hundred acres in Pittsburg field, Camp County, Texas. This proposition should be attractive to those with ample capital and seeking production; risk is nominal considering immense potential possibilities. Address: Box 48, c/o The Oil Weekly, Houston, Texas.

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■ 2000 to 3000 feet of 2-inch upset seamless tubing in 20 or 30 foot lengths with tool joints not larger than 3-inch O.D., suitable for use as drill pipe on Failing core drill. Merry Bros. & Perini, Box 840, Abilene, Texas.

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Regular classified advertisements for this special section, set in type this size without border, take flat rate of 7 cents per word for the first insertion and 5 cents per word for each subsequent insertion of same copy. Display advertisements for this section, set in suitably larger type with ruled border, are $5.00 per inch for first insertion and $4.00 per inch for subsequent insertions. Remittance must accompany copy which should be sent to:

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Major oil company wants young man or young woman with good legal training for work in Land Department. Please state qualifications and experience in first letter. Address L. M. Lamar, 1818 Canal Bldg., New Orleans 12, Louisiana.

■ WANTED: A Petroleum Engineer with field experience, for engineering development work, with a large manufacturer of oil field equipment and materials. Permanent position with good future for right man. In replying state age, education, business background, salary desired, etc. Address: Box 35, c/o The Oil Weekly, Houston, Texas.

Major oil company has openings available for graduate petroleum engineers having at least 3 years acceptable experience general oil field development. Salary open. All hiring will be done in accordance with War Manpower Commission Stabilization Plans. Reply to Box No. 33, c/o The Oil Weekly, Houston, Texas.

■ FORMER ENGINEERING STUDENTS—Major oil company desires applications of persons who are interested in getting into the petroleum industry and who have been engineering or geological students in a reputable school or university. Experience helpful but not essential. Do not apply if employed in essential activity at highest skill. Address: Box 35, c/o The Oil Weekly, Houston, Texas.

■ Young men with engineering or geological experience or training wanted for geophysical work with large Oil Company, Rocky Mountain area; Address: Box 47 The Oil Weekly, Houston, Texas.

FOR SALE

■ 12x12 OWS Heavy Duty Engine Skids Crane Trap Lubricator, Cutoff, Controls, etc. 8" Substructure with 24" Sub Base with Draw-works Extension. Boyken 7" Draw-works complete, Emsco Catheads, Engine and Draw-works made two wells. Steam End only for 20" Gardner pump new, complete. Tongs, Elevators, etc. 1 Butler Slip Type 7" to 10¾. B J LINKS and several American Overshots, complete. Victor C. Smith, El Dorado, Arkansas.

EAST TEXAS NEW PAY TEST

Limestone County—Groesbeck Shallow Field Discovery: Zephyr Oil Co.'s Nussbaum & Scharff 1, 700 ft fr m/s/sw 300 ft fr m/s/sel of 76-ac tract & S. H. Bates sur, elev 496 ft, Austin 2618-2890 ft, Georgetown 3228 ft, Goodland 3870 ft, Paluxy 3920 ft, 1st Glen Rose 4010 ft, anhydrite 4704 ft, Pettit 5415 ft, pump 39 bbls 41.4-gr oil, 24 bbls wtr, 2000 gals acid Upper Glen Rose perf 4734-88 ft, td 5515 ft.

TEXAS GULF COAST WILDCAT

Harris County—Failure: Wynn Crosby Drlg. Co.-Providence Oil Co.'s Bassett Blakley 1, 467 fr s&wl sec 3, HT&B sur, 5 mi nw of Clodine, abnd 8015 ft.

LOWER TEXAS COAST WILDCATS

Jim Wells County—Failure: H. F. Wilcox O&G Co.'s Almond B-1, 1513 fr n 330 fr wl 400-ac lse 2½ mi wsw of Alfred, abnd 5421 ft.

Nueces County — Bluntzer Area Discovery: Hewit & Dougherty's Selma Mumme 1, 467 fr se&nel lot 12 sh 8, Casa Blanca Gr on 300-ac lse, perf 20 shots 5550-55 ft, shut in gas well, no gge, td 6252 ft.

TEXAS GULF COAST WILDCAT

Brazos County—Millican Area Discovery: Phillips' Wharton Weems 1, 2275 fr e 380 fr nl 289-ac lse, J. M. Barrera sur, elev 256 ft, perf 3104-07 ft, flow 5,500,000 gas, 2-in open tbg, sip 1290, td 4998 ft, pb 3270 ft.

SOUTHWEST TEXAS WILDCATS

Duval County—Failures: M. E. Davis' Atlee Parr 1, 5492 s alg el Parr Rch San Andres A. Garcia Gr fr sec lot 13, W. E. Price subdvn, abnd 5616 ft.

J. W. Gorman's W. K. Hoffman A-1, 1986 fr swl BS&F sur 113, 326-ac lse nw¼ sec 113, abnd 3375 ft.

J. W. Gorman's W. K. Hoffman B-1, 330 fr nwl 330 fr nl 320-ac sur 116, abnd 3366 ft.

Magnolia's Duval County Rch Co. 1, 2310 fr el 330 fr sl CCSD&RGNG sur 80, 640-ac tr, abnd 4060 ft.

H. J. Porter's W. W. McCampbell 1, 1350 fr nwl 450 fr swl sur 12, 640-ac lse, abnd 4003 ft.

SOUTHWEST TEXAS OUTPOST

Jim Hogg County—Yaeger Extension: Magnolia's Yaeger Hrs. 1, 330 fr n&el TTRR sur 226, 640-ac lse, sand 3732 ft, pump 42 bbls 36.2-gr, td 3740 ft.

TEXAS PANHANDLE WILDCAT

Potter County — Failure: Canadian River Gas Co.'s Bivens 30-A, c se nw AB&M sec 192, blk 2, elev 3541 ft, abnd in salt wtr 4051-80 ft.

NORTH TEXAS WILDCATS

Archer County—Failures: Cochran & Cain's Herron 1, 150 ft snl 670 ft ewl sec 16, blk 5, Clark-Plumb sur, abnd 1120 ft.

Cunningham & Grace's Carter 1, 1140 ft snl 200 ft wel sec 37, blk 5, Clark-Plumb sur, abnd 1139 ft.

Fortex Oil Corp.'s Otto 1, 150 ft snl 2088 ft wel sec 69, blk 3, Clark-Plumb sur, abnd 1350 ft.

Clay County—Failure: Consolidated Oil Co.'s Gilbreth 1, 790 ft nsl 973 ft ewl sec 1, San Augustine University sur, Bend 5644 ft, Ellenburger 6295 ft, abnd 6450 ft.

Cooke County—Failure: Martin Properties-J. W. Hastings' Cannon 1, 1100 ft nsl 2800 ft ewl, J. F. Johns sur A-1569, abnd 1386 ft.

Montague County—Failure: J. A. McCarty-J. P. Coleman's Howard 1, 330 ft nsl 400 ft ewl G. W. Coffee sur A-144, Ellenburger 3890 ft, abnd 4246 ft.

United States Wildcat Starts

ARKANSAS

Ashley County: Union Producing Co.'s Crossett Lbr. Co. E-1, 12-9-7, dr 3725 ft.

CALIFORNIA

Contra Costa County: Shell's Heidora 1, sw ne ne 4-1-2, Neroly area, mim.

Imperial County: Standard's Southern Land Co. 1, 27-11-9, Salton Sea area, mim.

Kern County: D. D. Dunlap Oil Co.'s Fritz-Noel 1, ne nw sw 20-29-21, Cymric area, rig.

K. & G. Drilling Co.'s 1, sw se se 25-29-20, Temblor area, mim.

Etienne Lang's Antelope 1, se se ne 25-26-18, Antelope area, rig.

Dwight Vedder's Union 1, sw sw ne 18-27-28, Mount Poso area, mim.

Los Angeles County: Capital Co.'s Cole 1, 400 ft s 100 ft wly fr c/l Seventh and Orange Grove, Turnbull Canyon area, lcn.

Ventura County: Pacific Western's Richardson 1, ne nw ne 24-3-21, South Mountain area, mim.

KANSAS

Barton County: Carlock's Ehly 1, nec se 5-18s-11w, lcn.

Cowley County: Continental et al's Frye 1, se ne ne 23-31s-3e, lcn.

Ellis County: Cities Service's Younger 1, sec 9-12s-19w, lcn.

Ellsworth County: Bridgeport's Shanalec E-1, nec se 29-15s-9w, lcn.

Bridgeport's Haferman A-1, se ne ne 36-16s-7w, lcn.

Geary County: Transcontinental's Acker 1, c ne ne 1-12s-4e, mim.

Graham County: Texas Co.'s Fitch 1, se se se 2-7s-21w, mim.

Greenwood County: McGinnis' Leedy 1, swc nw 31-25s-12e, rum.

Marion County: Ingling Drlg. et al's Funk 1, swc 23-19s-2e, dr 210 ft.

McPherson County: Phil-Han et al's Kelfer 1, nw nw se 11-19s-1w, rur.

Pratt County: Cities Service's Brewster 1, sec ne 22-28s-14w, lcn.

Rawlins County: Stanolind's Mullen 1, swc se 14-4s-35w, mim.

Rice County: Nelson Drlg.'s Zajic 1, swc 35-18s-6w, dr 1115 ft.

Rooks County: Vickers' Stull 1, nwc 10-6s-16w, lcn.

Barnsdall's Schlin 1, swc nw 9-9s-18w, lcn.

Russell County: Stanolind's Seeley 1, sw se sw 1-13s-15w, lcn.

Sedgwick County: Beech Aircraft's Parrish 1, se nw ne 29-28s-2e, dr 218 ft.

Stafford County: Harbar Drlg.'s Fruehauf 1, sw se sw 15-22s-12w, dk.

NORTH LOUISIANA

DeSoto Parish: Dale W. Moore's Ruffin 1, sw se sw 10-13-13, lcn 2900-ft test.

A. W. Phillips-S. C. Schoonmaker's Anthony A-1, 830 n 660 w fr sec ne 9-11-14, lcn 5000-ft test.

MISSISSIPPI

Madison County: Carter Oil Co.'s I. Hesdorffer 1, c ne nw 20-11n-4e, lcn.

Claiborne County: Sun's W. R. Hammett 1,

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University of Texas, Austin, Texas

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NEW MEXICO

Lea County: Stanolind's State 1-L, c ne ne 17-18s-36e, lcn.

OKLAHOMA

Grant County: Northern Ordnance's Whitworth 1, nw ne se 4-25n-3w, rur.

Kay County: Reinhart et al's Thompson 1, se se sw 19-27n-5e, sd.

Lincoln County: Flynn Oil's Kinsey 1, ne nw nw 22-12n-4e, lcn.

Sunray's Nelson 1, se nw se 21-13n-6e, rig.

Wilcox O&G Co.'s DeLozier 16 (OWDD), dr 4170 ft.

Logan County: Phillips' Cavin 1, ne nw nw 32-15n-4w, rur.

Marshall County: Steffenson Trust's Little 1, nw sw se 1-6s-4e, pits.

Oklahoma County: Jordan's Williams 1, sw se sw 11-14n-1w, rur.

Phillips' Gomer 1, sw nw 16-14n-4w, rig.

Payne County: Skelly's Okeefe Hrs. 1, nw nw ne 26-19n-5e, c&p.

WEST TEXAS

Howard County: L. C. Harrison et al's B. H. Snyder 1, nw nw nw T&P 20, blk 30, T-1-S, 1½ mi nw&w of nearest prod, lcn 3200-ft test.

Menard County: B. A. Duffy et al's Sol Mayer 1, 660 ft out se cor sec 1483, A-89, lcn 4200-ft Ellenburger test.

Pecos County: Pure's Neal Tanguay 1, 664 ft nsl 4513 ft ewl sec 4, blk 183, W. J. Mitchell sur, lcn 5500-ft Delaware test.

Reagan County: Byrd & Frost's University 1, c ne ne sec 18, blk 2, 4½ mi w by n of Big Lake field, lcn 4000-ft test.

WEST CENTRAL TEXAS

Jones County: Jones-Stasney and Primo Oil Co.'s C. H. King 1, 330 ft nsl 1650 ft ewl sec 14, Wm. Smith sur, lcn 2200-ft test.

SOUTHWEST TEXAS

Duval County: M. E. Davis' Atlee Parr 2, 3350 fr el of lse and San Andres Gr, dr 1199 ft.

J. W. Gorman's W. K. Hoffman B-2, 330 s of nl 990 e of No 1 on 320-ac lse, BS&F sur 116, dr 850 ft.

M. M. Miller & Sons' Leroy Denman 1, 990 fr wl 330 fr nl 80-ac lse, Santos Garcia sur, lcn 5500-ft test.

Taylor Ref. Co.'s E. A. Parr A-4, 1130 fr wl 475 fr nly nl 640-ac lse, sur 303, lcn 5100-ft test.

Jim Hogg County: Texas Co.'s W. H. Yaeger 4, 2350 fr e 2315 fr sl sec 165, lcn 4500-ft test.

Zapata County: R. E. Hibbert's A. Garcia 1, 330 fr ne 330 fr sel sec 17, Charco Redondo Gr, 2243-ac lse, lcn 1000-ft test. Was 600-ft prod on this lse.

LOWER TEXAS COAST

Goliad County: Ginther, Warren & Ginther's Fromme et al 1, 330 fr wl 1079 fr s cor 1132-ac lse, Geo. Kersey sur, lcn 3000-ft test.

Nueces County: Siosi Pet. Co.'s C. D. Whatley 1, 330 out of nec sw sec 41, fourth addn, Taft fm lots, lcn.

Victoria County: Northern Ordnance's O. W. Schaefer 1, 800 fr nwl 467 fr nel of lse 11,900 fr swl W. J. Eaton sur, lcn.

TEXAS GULF COAST

Jefferson County: Shell et al's McFaddin Tr. E-1, 4900 fr n 1200 fr el sec 354, 5120-ac lse, Henry Gentz sur A-706, lcn 8500-ft test.

EAST TEXAS

Harrison County: Roy I. Davis and H. J. Streif's Albert White 1, Zion Roberts sur, 5 mi se Hallsville, 3000-ft test, dr.

NORTH TEXAS

Archer County: D. H. Bolin et al's C. L. Abercrombie 1, 2640 ft nsl 1320 ft ewl, Wm. Cound sur sec 2, A-798, lcn 1400-ft test.

D. H. Bolin et al's W. C. Thomas 1, 466 ft nsl 600 ft ewl, J. R. Blessing sur A-975, lcn 1400-ft test.

D. H. Bolin et al's W. H. Thomas 1, 300 ft ewl on sl of lot 16, N. Thomas sur A-454, lcn 1400-ft test.

Fortex Oil Corp.'s L. F. Wilson-McCrory 1, 2340 ft snl 1920 ft ewl, S. P. Ry. sec 1, A-412, lcn 1700-ft test.

Jas. McMahon-O'Donohoe & Kelleher's D. L. Wolf 1, 800 ft snl 1400 ft wel, S. P. Ry. sec 2, A-1300, lcn 1400-ft test.

Perry-Woody & Meredith Dr. Co.'s G. B. Prideaux 2, 2300 ft nsl 250 ft wel, Robt. Crossman sur A-65, lcn 800-ft test.

Cooke County: Northern Ordnance's S. P. Ware-M. C. Scott 1, 330 ft out sec 60-ac tract, Wm. Moore sur A-622, lcn 6000-ft test.

Northern Ordnance's John Ware 1-B, 330 out nwc, C. P. Coy sur A-1243, lcn 5000-ft Ellenburger test.

WYOMING

Carbon County: Stanolind's Union Pacific 1, ne se ne 19-18n-77w, Cooper Cove, lcn ¾ mile nw of discovery.

H. H. CHAMPLIN, 76, of Enid, Oklahoma, president of Champlin Refining Company, died May 1. He entered the oil business with the opening of the Garver-Covington pool in 1917 and built a refinery with a capacity of 16,000 barrels daily. About a year ago the refinery installed equipment to manufacture 100-octane gasoline. The company operates a 516-mile gasoline line from Enid to Rock Rapids and Sioux City, Iowa, and Superior, Nebraska.

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Squeaks from the Bull Wheel

Perhaps She Doesn't

"My wife doesn't understand me. Does yours?"

"Don't know. Never heard her mention your name."

Diplomat

"Will you love me as much in March as you did in February?"

"More, dear—there are more days in March."

But He Gets More

"What's a Grecian urn?"

"Not very much."

Party With a Purpose

"Johnny, I dislike to tell you, but last night at the party your sister promised to become my wife. Can you forgive me for taking her away?"

"Shucks, that's what the party was for."

Only Chance

"How come you go steady with Helen?"

"Well, she's different from the other girls."

"How is that?"

"She's the only girl who'll go with me."

Revenge

First Little Bird: "Who's that sitting on the bench below us?"

Second Little Bird: "Oh, that's the guy who fired the buckshot at us the other day."

Third Little Bird: "Well, what are we waiting for?"

Shrdlu Etaoin

"Why is a girl like a typewriter?"

"Go ahead—I'll bite."

"If you press the wrong places you get terrible words."

Spontaneous

Doctor: "Wait a minute, you are too quick; I didn't tell you to say 'Ah.' "

Patient: "I know you didn't. I just caught a glimpse of your nurse."

Wrong Specifications

"Why are you looking so fed-up?"

"I bought a book called 'How to Make Love,' and now I don't know what to do."

"Why?"

"Well, it says to take the girl's hand, look into her eyes, and say: 'I love you, Beatrice.' "

"What's wrong with that?"

"My girl's name is Lizzie."

Before Taxes

In a civil service examination given in New York some time ago, one of the questions asked was the following:

"If a man buys an article for $12.25 and sells it for $9.75, does he gain or lose by the transaction?"

One of our modern young sweet things, with good looks unmarred by brains, after studying for a while, gave the following answer:

"He gains on the cents but loses on the dollars."

Right Answers

Captain: "Your name?"

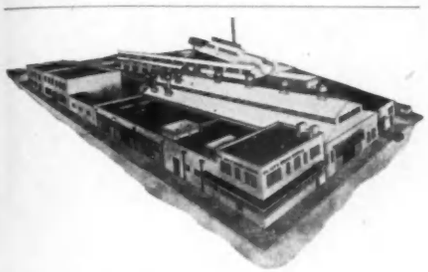
Private: "Jones, sir."

"Your age?"

"Twenty-four, sir."

"Your rank?"

"I know it, sir."



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Speed Reducers

D. O. James Manufacturing Company, 1140 W. Monroe Street, Chicago, has published catalog No. 1000R, which covers various types of speed-reducing transmissions. Included are continuous-tooth herringbone gear speed reducers, planetary gear speed reducers, right angle spiral bevel gear speed reducers, right angle spiral bevel herringbone gear speed reducers, right angle spiral bevel planetary gear speed reducers, worm gear reducers, type "M," helical worm gear speed reducers, double worm gear speed reducers, combination vertical worm gear and spur gear reducers; motorized worm gear speed reducers, motorized gear speed reducers and flexible couplings and combination automatic backstop and flexible couplings.

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Because of the *exclusive controlled expansion feature* of the "Double E" Swab, you are assured of full fluid recovery with minimum wear of cups. You do have the ultimate advantage when you can control the pressure of the cups against the wall while swabbing. With no load lost and minimum wear you have the best.

The "Double E" Cups best show their worth when swabbing abrasive tubing or casing walls—and they really lift salt water.

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Notes for the Equipment Buyer and User

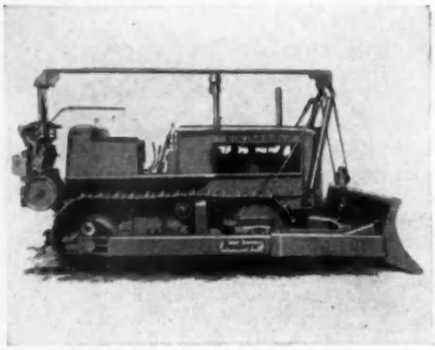
Bulldozer

BUCKEYE TRACTION DITCHER COMPANY

Buckeye Traction Ditcher Company, Findlay, Ohio, has perfected a cable-controlled bulldozer and trailbuilder, called the "Centro-Lif," offered in two models: one weighing 5855 pounds, without the power control unit, for Allis-Chalmers HD-14 tractors, and the other, weighing 5140 pounds, without the power control unit, for Allis-Chalmers HD-10-W tractors. Both models are controlled by single- or double-drum power-control units. In each model the engine is mounted and the cable is carried overhead from winch to moldboard.

The principal feature is the center lift construction of the moldboard which provides: light weight for its size, simple construction, and straight lift of the blade. The horn is designed so that the moldboard is close to the tractor radiator. The push arms are so constructed that the moldboard pivots about a single king pin and can be angled to the right or left by removing two landside pins, swinging the moldboard to the desired side, and replacing the landside pins. The moldboard can also be easily tilted by means of a double trunnion mounting of the push arms. By attaching one push arm to the top trunnion on one side while the other arm is mounted on the lower trunnion on the opposite side, a vertical adjustment at end of moldboard is provided.

Maximum height of lift of leading corner of blade is 53 inches, while digging depth of blade below grade is unlimited.



"Centro-Lif" Bulldozer and Trailbuilder.

Truck Crane

HARNISCHFEGER CORPORATION

Harnischfeger Corporation, Milwaukee, announces a heavy-duty truck crane, said to have highly increased efficiency and mobility.

Its main feature is a carrier built for crane work, not for crane transportation alone. Lower center of gravity gives greater stability in terms of hoisting capacity and boom reach, without the use of outriggers. With outriggers, working range is proportionately increased, and, being built closer to the ground, outriggers require little blocking. The problem of sway at the boom point is markedly lessened by a new weave-proof frame of all-welded box section construction with a built-in torsional bar.

The crane machinery is a standard P&H Model 255-A crane upper, complete with P&H low-pressure, direct acting hydraulic control and triple-safe planetary boom hoist. Operation is independent of carrier power, with either gasoline or diesel motor. The unit is within standard road clearances, and its comparatively short wheelbase allows maximum maneuverability on the highway, as well as on the job. Tractive power is by double drive axles in tandem. Low range transmission with 10 speeds forward and 2 reverse, gives great pulling power—8 large rear tires provide low ground pressure. Steering is by double cam and roller bearings with 21 to 1 ratio. All air lines, tanks and braking system are protected against damage, yet are fully accessible. The unit is recommended for all types of materials handling work and can be equipped with hook, clamshell, magnet, dragline, etc.

Harnischfeger P&H Truck Crane

Spiral Thread Cartridge

Hercules Powder Company, Explosive Department, Wilmington, Delaware, has published a booklet illustrating the use of a cartridge with a spiral thread in seismic exploration and in blasting river crossings for pipe lines.

The cartridge consists of dynamite packed in a strong paper shell equipped with a spiral thread. This shell screws into a stout spiral-grooved sleeve. In loading, a sleeve is screwed over the two halves of adjacent cartridges until they butt together.

Orifice Computer

SONNEY ORIFICE COMPUTER

Sonney Orifice Computer, 925 Central Avenue Extension, Oil City, Pennsylvania has improved its orifice computer and expanded its use to include computations of steam measurement.

The device is available in two sizes for office, field or shop use. It is designed to permit operators to make orifice meter computations quickly and easily in any situation where gas or steam is measured by the orifice principle.

Cellulose acetate plastic is the material used in manufacturing the improved computer.

The range of deliveries, pressures, differential and size of orifice cover practically all conditions met in ordinary practice. This computer is adaptable in determining: rate of delivery of gas in cubic feet per day or per hour through an orifice meter; rate of delivery of steam in pounds per day or per hour; size of orifice to install in a meter; differential or pressure to maintain to deliver a desired rate of gas or steam; approximate coefficient for the orifice from known or assumed gas characteristics; and open flow rate when using the orifice open flow tester.

Although no coefficient for the orifice is necessary for ordinary computations, correction factor scales and table of standard coefficient settings for both flange and pipe taps are provided for use where more accurate computation is desired.

The computer may be used in orifice meter measurement of gas, steam and water.

Sullivan Machinery Company Names Two Vice Presidents

Sullivan Machinery Company, Michigan City, Indiana, recently elected O. J. Neslage and J. A. Drain, Jr., as vice presidents. Neslage is in charge of sales in the United States and Mexico, and Drain will direct product engineering, research and development.

Oil Well Gets Award

Oil Well Supply Company, Dallas, has been awarded a second white star to be added to the Army-Navy E in recognition of the maintenance of "the fine record in production of wartime equipment."

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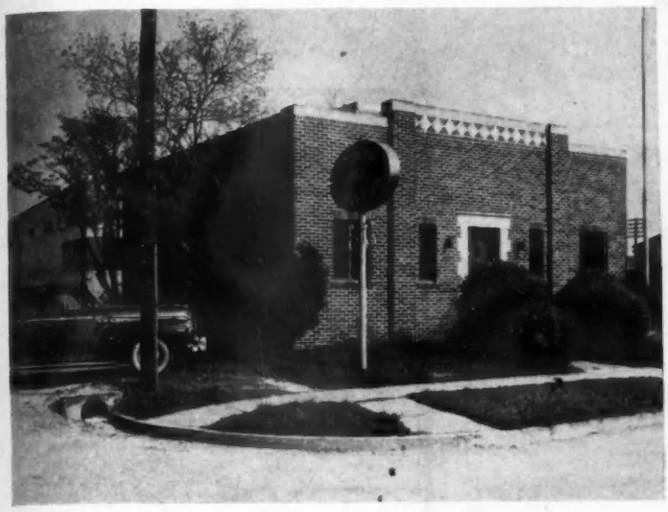

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Brick Elliott Back in Industry After Chemical Warfare Service

Major J. E. (Brick) Elliott, well known to the oil industry internationally, has retired from the Chemical Warfare Service and is returning to private life. He will be located in Austin, Texas, from which point he will reengage in the oil business.

Production Award

D-B Division of Emsco Derrick & Equipment Company, Dallas, Texas, has been awarded the Army-Navy E for excellence in war production.

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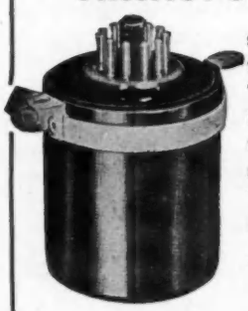

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